

TIME (HR : MIN)	IV	Increment 16 10A Stage – US EVA 11 (Bravo) EV1	EV2
00:00 ---		<u>POST DEPRESS</u> (00:05)	<u>POST DEPRESS</u> (00:05)
---		<u>EVA 2 EGRESS/SETUP</u> (00:10)	<u>EVA 2 SETUP</u> (00:10)
---		<u>REMOVE STBD NH3 JUMPER</u> (00:30)	<u>CONFIGURE VENT TOOLS</u> (00:30)
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---		<u>VENT/STOW STBD NH3 JUMPER</u> (00:50)	<u>REMOVE NODE 2 FLUID CAPS</u> (00:20)
01:00 ---			<u>RECONFIGURE SFU</u> (00:20)
---			<u>RELEASE NODE 2 LOOP A FLUID TRAY</u> (00:45)
---		<u>RELEASE NODE 2 LOOP A FLUID TRAY</u> (00:35)	
---			
02:00 ---		<u>RELOCATE NODE 2 LOOP A FLUID TRAY</u> (00:30)	<u>RELOCATE NODE 2 LOOP A FLUID TRAY</u> (00:30)
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---		<u>ATTACH NODE 2 LOOP A FLUID TRAY</u> (00:30)	<u>ATTACH NODE 2 LOOP A FLUID TRAY</u> (00:30)
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03:00 ---		<u>DEPLOY NODE 2 LOOP A FLUID TRAY</u> (00:25)	<u>DEPLOY NODE 2 LOOP A FLUID TRAY</u> (00:25)
---		<u>VENT NODE 2 LOOP A FLUID TRAY</u> (00:40)	<u>MATE/OPEN HINGE QDS</u> (00:40)
---			
04:00 ---		<u>MATE/OPEN S0 QDS</u> (01:10)	<u>MATE/OPEN NODE 2 QDS</u> (01:10)
---			
---		<u>CONFIGURE HEATER CABLES</u> (00:20)	<u>CONFIGURE NODE 2 PORT AVIONICS</u> (00:50)
---		<u>MATE PRIMARY PMA2-NODE 2 UMBILICALS</u> (00:35)	
---			
05:00 ---			
---		<u>EVA 2 CLEANUP/INGRESS</u> (00:15)	<u>EVA 2 CLEANUP/INGRESS</u> (00:15)
06:00 ---		<u>PRE REPRESS</u> (00:05)	<u>PRE REPRESS</u> (00:05)
---	EVA = 6:40		

## PRE US EVA 11 TOOL CONFIG

### EV1

- ☒ MWS
- ☒ BRT (L)
- ☒ RET (eq-eq)
- ☒ Wire Ties
  - ☒ Short (3)
  - ☒ Long (2)
- ☒ T-Bar
- ☒ RET (eq-eq) (2)
- ☒ RET (eq-eq) w/ PIP pin (1)
- ☒ Wire Ties (2)
- ☒ Small Trash Bag
- ☒ Socket Caddy
  - ☒ 7/16 Socket - 9 ext (w/ decoration)
- ☒ RET (eq-eq) (2)
- ☒ Over-gloves (2)
- ☒ Swing Arm (R)
  - ☒ PGT [MTL 30.5] S/N \_\_1\_\_
  - ☒ PGT Battery S/N \_\_1007\_\_
  - ☒ 7/16 Socket - 2-in ext
  - ☒ RET (eq-eq)
- ☒ Waist Tether (R & L)
- ☒ D-ring Extender (R & L)
- ☐ SAFER
- ☒ WVS
- ☒ Safety Tether, 85'
- ☐ GP Caddy
- ☐ 1 - Pair of over gloves

### Crewlock Bag #4 (QD Tools)

- ☐ w/ RET (Lg-sm) to bag exterior
- ☒ Adj Equip Tether (on bag exterior)
- ☒ Wire-ties, Long (2 for shunt jumper, on internal RET)
- ☒ 1" QD Release Tool (on internal RET)
- ☒ 1" QD Bail Drive Lever (on internal RET)
- ☒ RET (1 to internal tether point)
  - ☒ N<sub>2</sub> Vent Tool
- ☒ RET (2 for jumper SPDs, to internal tether points)
- ☒ RET (1 for vent tool, to ext bag handle)
- ☒ RET (1 to internal tether point)
  - ☒ Button depress tool (1-in)
- ☐ RET (1 to internal tether point)
- ☐ Anti Kickback Tool (1-in)

- ☐ Total RETs sm-sm used – 18
  - ☐ Total RETs with PIP pin – 4
  - ☐ Total RETs Lg-sm – 3
  - ☐ Total Adj tethers – 9

### EV2

- ☒ MWS
  - ☒ BRT (L)
  - ☒ RET (eq-eq)
  - ☒ Wire Ties, Short (3)
  - ☒ Wire Ties, Long (2)
  - ☒ T-Bar
  - ☒ RET (eq-eq) w/ PIP pin (2) - ~~to wire ties in trash bag~~
  - ☒ RET (eq-eq) w/ PIP pin (1)
  - ☒ Wire Ties (2)
  - ☐ Adj tether (1) (fairleads)
  - ☒ Small Trash Bag
    - ☒ Wire-tie (1) (fairlead)
    - ☐ Wire-ties (2) (fluid QDs)
  - ☒ Socket Caddy
    - ☐ 7/16 Socket - 9 ext (w/ decoration)
  - ☒ RET (eq-eq) (2)
  - ☒ Over-gloves (2)
  - ☒ Jettison Stowage Bag
    - ☒ RET (on drawstring, bundled in bag)
    - ☒ Adj Equip Tether - for handling (to RET, bundled in bag)
    - ☒ Adj Equip Tether (for handling) (to adj, around bundle)
  - ☒ Swing Arm (R)
    - ☒ PGT [MTL 30.5] S/N \_\_5\_\_
    - ☒ PGT Battery S/N \_\_1006\_\_
    - ☒ RET (eq-eq)
  - ☒ Waist Tether (2) (R & L)
  - ☒ D-ring Extender (2) (R & L)
  - ☐ SAFER
  - ☒ WVS
  - ☒ Safety Tether, 85'
  - ☐ GP Caddy
  - ☐ 1 - Pair of over gloves
- ### Crewlock Bag #1
- ☐ RET (Lg-sm) (on bag exterior)
  - ☐ Adj Equip Tether (on bag exterior, secures bag at worksite)
  - ☒ Adj Equip Tether (on internal RET)
    - ☒ SPD, 1" (2)
  - ☒ Adj Equip Tether (on internal RET)
    - ☒ SPD, 1" (2)
  - ☒ Stbd Fluid Tray Blanket
    - ☐ Adj Equip Tether (wrapped around blanket)
    - ☒ RET (tether blanket to bag exterior)
    - ☐ Attach to crewlock bag with own strap and an internal
  - ☐ Digital camera
    - ☒ RET (tether camera in bag)
  - ☒ RET
    - ☒ to Adj Equip Tether (for caps, attach to ext bag handle)
  - ☐ Wire Tie Caddy (1 - on internal RET) (need to load)

### Prior to EVA, inspect:

- ☐ RET cord for damage
  - ☐ BRT for loose fittings/screws
  - ☒ MWS for loose screws
  - ☐ Safety/waist tether load alleviating straps: no red

Note: Use Blue S/N Tethers

### AIRLOCK CONFIG

#### Staging Bag

- ☐ Fuse Tether (1)
- ☐ Connector Cleaner Tool Kit
- ☐ Connector Pin Straightener
- ☐ Probe
- ☐ Velcro/Tape Caddy
- ☐ Pry Bar
- ☐ Fuse Tether (1)
  - ☐ PGT (spare) S/N \_\_\_\_\_
  - ☐ PGT Battery S/N \_\_\_\_\_
- ☐ Wire Tie Caddy (w/ 9 wire ties)
- ☐ Vise Grips
- ☐ EVA Ratchet
- ☐ Cheater Bar

#### IV Bag

- ☐ Contamination Detection Kit
- ☐ Gold Salt Coupon (6)
- ☐ Color Chart (2)
- ☐ ISS Contamination Sampler (2)
- ☐ Shuttle Contamination Sampler (2)
- ☐ Nitrogen Dioxide Draeger Tube (6)
- ☐ Ammonia Draeger Tube (6)
- ☐ DCM Plug (2) - SAFER Hard Mount
- ☐ GP Caddy (2)
- ☐ Thermal Mittens (2 pr)
- ☐ Socket Caddy
  - ☐ 1/2 x 8-in socket (IV Hatch)
  - ☐ 7/16 x 6-in socket (backup)
- ☐ Fuse Tether
- ☐ Long duration tie-down tethers (4)
- ☐ 1 – RET (Lg-sm)
  - ☐ APFR 3 (S/N 5) at \_\_, XX, F, 12
  - ☐ Safety Tether, 55' (Lg-sm)
- ☐ D-ring extender on EVA hatch D-ring

## EVA BRIEFING CARD

EV 1/3	EV 2/4	IV 1	IV 2
Exercise			Campout
Wake-up (GMT)	_____ : _____		Wake-up (GMT)
EVA Prep start	_____ : _____		Repress for hygiene
Depress to 10.2	_____ : _____		Depress to 10.2
Start purge	_____ : _____		Start purge
PET 00:00	_____ : _____		PET 00:00

### EVA Prep

- Get-up plan – clothing and EMU equip bag, Hygiene break
- Exercise protocol review, if required
- Equipment lock activities – IV responsibilities
- Suit donning plan – special requests
- SAFER, MWS, tools, CL positions and bag stowage
- Airlock depress review
- EV/IV comm protocol
- SRMS/SSRMS initial position

### EV Crew Procedure Review

- Egress Plan
- Translations – tether swaps
- Order of tasks
- Glove inspections
- Ingress Plan

### General Procedure Review

- Get ahead tasks
- Constraints – ground and flight
- Cautions and warnings review
- Contingency procedures – crib sheet
  - Immediate steps for fluid QD leaks

### Emergencies review

- Lost comm
- EMU malfunctions
- Lost tools
- Lost crewmember
- DCS
  - Incapacitated crew rescue
- Contamination/Decontamination
- Abort and Terminate
  - Fluid tray emergency secure
  - Tether ops

### Post EVA

- Suit doffing responsibilities
- Post EVA plan

Lessons learned from previous EVAs

## US EVA 11 INHIBIT PAD

### USOS

#### PCU

##### NOTE

PCUs may require up to 1 hr warm-up period before they are operational

- MCC-H 1. √PCUs (two) operational in discharge mode and one of the following:
- A. CCS PCU EVA Hazard Control enabled
  - B. No more than two arrays unshunted
  - C. No more than two arrays pointed < 105 deg from velocity vector
- OR
2. One or no PCUs operational in discharge mode and one of the following:
- A. No more than two arrays unshunted
  - B. No more than two arrays pointed < 105 deg from velocity vector

#### Ground Radar

- MCC-H 1. √TOPO and FDO consoles, ground radar restrictions in place for EVA

#### Lab Window

- IV 1. Close window shutter if EV crew less than 10 ft/3.5m from window

#### P1 SFU Reconfig

- MCC-H 1. RPCM P12B\_C RPC 4 – Open, Close Cmd Inhibit  
2. RPCM P12B\_C RPC 5 – Open, Close Cmd Inhibit  
3. RPCM P12B\_C RPC 6 – Open, Close Cmd Inhibit  
4. RPCM P12B\_C RPC 7 – Open, Close Cmd Inhibit

### USOS

#### Lab/Node 2 Loop A/Port Avionics Umbilical Mates

- MCC-H 1. MBSU 1 RBI 10 & 11 – Open, Close Cmd Inhibit  
2. MBSU 4 RBI 2 & 10 – Open, Close Cmd Inhibit  
3. RPCM S01A\_D RPC 4 & 5 – Open, Close Cmd Inhibit  
4. RPCM S02B\_D RPC 2 – Open, Close Cmd Inhibit  
5. RPCM S03A\_C RPC 1 & 2 – Open, Close Cmd Inhibit  
6. RPCM S04B\_C RPC 3 & 4 – Open, Close Cmd Inhibit

#### Lab Loop A Fluid Tray Heater Umbilical Mates

- MCC-H 1. RPCM S02B\_D RPC 2 – Open, Close Cmd Inhibit

#### P1 TRRJ – (P1 SFU)

One TRRJ DLA locked at 0 deg for EV crew work on P1 zenith:

- MCC-H 1. √DLA (1) – LOCKED

#### PMA2/Node 2 Primary Umbilical Mates

- MCC-H 1. DDCU LA1A or LA4A CONVERTER - OFF  
2. RPCM N21A4A\_B RPC 1-5 & 12-16 – Open, Close Cmd Inhibit

#### Get-Ahead: Stbd Avionics Umbilical Mates

- MCC-H 1. MBSU 2 RBI 3 & 10 – Open, Close Cmd Inhibit  
2. MBSU 3 RBI 2 & 3 – Open, Close Cmd Inhibit  
~~3. RPCM S01A\_D RPC 2 – Open, Close Cmd Inhibit~~  
4. RPCM S02B\_D RPC 4 & 5 – Open, Close Cmd Inhibit

Cont on next page

## US EVA 11 INHIBIT PAD

### RSOS

#### SM Antennas

- MCC-M
1. Global Timing Sys 1(400.1 MHz) [GTS] – Deactivate
  2. ARISS (HAM Radio) – Deactivate or VHF (144-146 MHz) TX only

#### FGB Antennas

- MCC-M
1. ARISS – Deactivate

#### FGB Thrusters

- MCC-M
1. √FGB MCS unpowered
  2. √All FGB Attitude Control Thruster Valves (eighty) – closed
  3. √FGB Attitude Control Manifold Valves – closed  
KШK1, KШK2, KШK4, KШK5, KШK9, OKO3, OKГ3, OKO6, OKГ6, OKO7, OKГ7, OKO8, OKГ8

#### Soyuz Antennas

- MCC-M
1. √Soyuz KURS A [KYPC A] – Deactivated

#### Soyuz Thrusters

- MCC-M
1. √Soyuz manifolds (four) – closed  
ЭКО1, ЭКО2, ЭКГ1, ЭКГ2
  2. √Soyuz MCS unpowered
  3. √Soyuz Attitude Control Thruster Valves (fifty-two) – closed
  4. √Soyuz Main Engine Valves (K1,K2,K3,K4,K5,K6) – closed

## EVA NOTES, CAUTIONS, AND WARNINGS

### NOTES

1. For bolt install: report good/nominal torque and turns
2. For bolt release: report torque and turns if different from published range
3. EVA connectors: after disconnection and prior to connection; verify pin and EMI band integrity; verify connector free of FOD
4. MLI handholds are not rated for crewmember translation loads
5. Toolbox doors must be closed with one latch per door when EV crew not in immediate vicinity

### CAUTION

#### ISS Constraints

- D. Avoid inadvertent contact with:
1. Grapple fixture shafts (drylube)
  2. PIP pins
  3. Deployed MISSEs [A/L,P6]
  4. Passive UMAs
  5. MBS VDU, MCU, CRPCMs and Cameras (tape radiative surfaces, silver Teflon)
  6. Deployed TUS cable
  7. GPS Antenna (S13 paint) [S0]
  8. UHF Antennas [Lab,P1]
- E. Electrical cables:
1. Avoid bend radii < 10 times cable diameter
- F. For structural reasons:
1. Avoid vigorous body motions, quick grabs and kickoffs against tether restraints
  2. Avoid performing shaking motions (sinusoidal functions) more than four cycles
  3. Avoid kicking S1/P1 radiator beam
- If any of these occur, wait 2 to 5 min to allow structural response to dissipate
- G. Other:
1. ITT Cannon connector: do not turn collar from WHITE to BLACK without a mating half attached
  2. WIS Antennas: do not use as handholds [Z1,P4]
  3. Do not local tether to gap spanners during fluid tray relocation translations
  4. Minimize input loads while local tethered to a gap spanner
  5. Inspection of the waist tether must be performed prior to local tethering to a gap spanner to verify no red band visible
  6. If the crewmember comes off of structure while local tethered to a gap spanner, the waist tether must be inspected to verify no red band visible

### WARNING

#### ISS Constraints

- C. Avoid inadvertent contact with:
1. Grapple fixture targets and target pins
  2. Stay 2 ft from S1/P1 radiator beam rotational envelope when beam is free to rotate
  3. Stay 5 ft from moving MT on face 1
- D. Handrails:
1. Handrails previously used for MISSE attachment may not be used as a safety tether point [A/L endcone 566, A/L Tank 2 nad/fwd, P6 5389]
- E. Pinch:
1. ITT Cannon connector rotating housing
  2. EV side of IV hatch during hatch operations (also snag hazard) [A/L]
- F. RF radiation exposure:
1. Stay 1 ft from UHF antenna when powered [Lab,P1]
- G. Sharp edges:
1. Inner edges of WIF sockets
  2. Nickel coated braided copper ground straps may contain frayed wires [P6,P4]
  3. Keep hands away from SSRMS LEE opening and snares
- H. Thermal:
1. EVA connectors with booties may become hot and exceed their design temp limit if left uncovered in direct sunlight
  2. Turn off glove heaters when comfortable temp reached to prevent bladder damage. Do not pull fingers out of gloves when heaters are on
  3. Uncovered trunnion pins may be hot
  4. Do not touch EMU protective visor if temp has been, -134 for > 15 min
  5. No EMU boot contact with foot restraint when temp < -120 deg F or > 200 deg F

## FLUID QD CUE CARD

### **BLOCK A** (Close Valve with SPD):

Caution: If QD leaks, immediately open valve (pull bail fwd)

1. Open QD thermal bootie
2. Push bail fwd (open) with significant force to unstick male seal
3. Pull bail aft (against SPD) to hardstop
4. Push bail fwd again to full open
5. Remove SPD and temp stow
6. ✓Aft white band visible
7. ✓Detent button fully installed, up, and can be depressed
8. Assess side load prior to bail movement
9. Press detent button and move bail aft to close valve
10. Verify fwd white band visible
11. ✓Detent button up
12. ~~Rotate locking collar to locked~~

### **BLOCK B** (Close Valve w/o SPD):

Caution: If QD leaks, immediately open valve (pull bail fwd)

1. ✓Aft white band visible
2. ✓Detent button fully installed, up, and can be depressed
3. Assess side load prior to bail movement
4. Press detent button and move bail aft to close valve
5. ✓Fwd white band visible
6. ✓Detent button up
7. ~~Rotate locking collar to locked~~

### **BLOCK C** (Demate QD):

1. ✓Detent button - up
2. Assess & counteract side loads
3. Pull back on release ring
4. Demate QD
5. ✓Fwd white band not visible (release ring - retracted)
6. Inspect QDs for debris or damage
7. Reinstall thermal bootie

### **BLOCK D** (Mate QD):

1. Open QD thermal bootie
2. Inspect QDs for debris or damage
3. ✓Detent button - up
4. ~~✓Locking collar - locked~~
5. ✓Fwd white band - not visible
6. Assess & counteract side loads
7. Mate QD
8. ✓Fwd white band - visible
9. Snapback test (✓Fwd white band still visible)
10. Pull test
11. Visual gap test

### **BLOCK E** (Open Valve):

1. ~~Rotate locking collar - unlocked~~
2. Assess side load potential prior to opening valve
3. Depress detent button and move bail fwd to open valve
4. ✓Aft white band visible
5. ✓Detent button - up and can be depress
6. Close thermal bootie

### **BLOCK F** (Open Valve with SPD install):

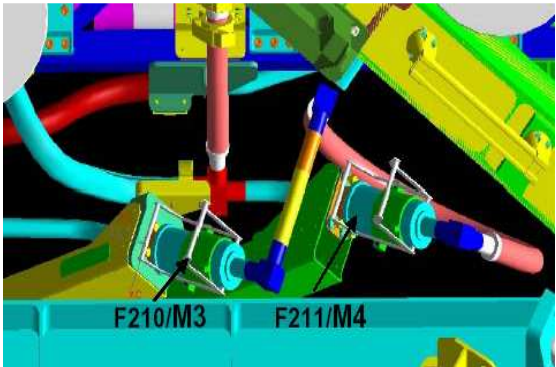
Note: These steps allow NH3 to flow through QD

1. ~~Rotate locking collar - unlocked~~
2. Assess side load potential prior to opening valve
3. Depress detent button and move bail fwd to open valve
4. ✓Aft white band visible
5. ✓Detent button - up and can be depress
6. Install SPD
7. ✓Capture points (4) - (2 on collar boss, 2 on bail boss)
8. ✓Capture hooks engaged with push test on levers
9. Perform pull test on SPD
10. Assess side load
11. Verify bail moves aft, then push bail full fwd
12. Close thermal bootie

## US EVA 11 EGRESS/SETUP (00:10)

IV	EV1 (FF)	EV2 (FF)
	<p><b>Initial Condition:</b> 85-ft safety tether (load alleviating reel end) on left D-ring extender. Right waist tether on EV2's 85-ft safety tether. Over gloves donned.</p> <p><u>EGRESS/SETUP (00:10)</u></p> <ol style="list-style-type: none"> <li>1. Open A/L thermal cover</li> <li>2. Egress airlock</li> <li>3. Receive crewlock bag #4; stow on BRT</li> <li>4. Translate to S0 face 6</li> <li>5. Attach own 85' safety tether at S0 HR 3412 (zenith standoff)               <ul style="list-style-type: none"> <li>- Engage crew hook slide lock - L</li> <li>- Verify hook gate closed</li> <li>- ✓ safety tether reel unlocked</li> </ul> </li> <li>6. Attach EV2's 85' safety tether at S0 HR 3413 (zenith standoff - route to stbd to clear)               <ul style="list-style-type: none"> <li>- Engage crew hook slide lock - L</li> <li>- Verify hook gate closed</li> </ul> </li> <li>7. Give EV2 GO to release waist tether</li> <li>8. ✓SAFER man isol vlv – open (down)</li> <li>9. ✓SAFER HCM – closed (down)</li> <li>10. Translate</li> </ol>	<p><b>Initial Condition:</b> Waist Tether (R) to center Airlock D-ring extender. 85-ft safety tether (load alleviating reel end) on left D-ring, and other end to EV1's right waist tether. Over gloves donned.</p> <p><u>EGRESS/SETUP</u></p> <ol style="list-style-type: none"> <li>1. Transfer crewlock bag #4 to EV1               <ul style="list-style-type: none"> <li>- Temp stow ret onto A/L D-ring</li> </ul> </li> <li>2. Egress A/L while still on waist tether</li> <li>3. Temp stow crewlock bag #1 onto BRT</li> <li>4. ON EV1 GO, release waist tether from A/L D-ring</li> <li>5. ✓SAFER man isol vlv – open (down)</li> <li>6. ✓SAFER HCM – closed (down)</li> <li>7. Close A/L thermal cover</li> </ol>

## REMOVE/VENT/STOW S0 STBD NH3 SHUNT JUMPER (01:20)

IV	EV1 (FF)	EV2 (FF)
<div data-bbox="113 321 699 695">  <p data-bbox="212 699 600 724">Starboard Shunt Jumper Location</p> </div> <div data-bbox="121 954 678 1096" style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p style="text-align: center;"><u>NOTE</u></p> <p>If EV1 ahead of EV2, only close 1 valve. Wait until the vent tool is ready prior to closing the 2<sup>nd</sup> valve</p> </div> <div data-bbox="96 1276 665 1333" style="margin-top: 20px;"> <p>1. MCC-H: Begin 22 min clock for shunt jumper once isolated and in sunlight.</p> </div>	<p><u>REMOVE S0 STBD SHUNT JUMPER (00:30)</u></p> <ol style="list-style-type: none"> <li>1. Translate to S0 stbd shunt jumper</li> <li>2. Temp stow crewlock bag #4 at S0 handrail 3410</li> <li>3. Perform glove inspection</li> <li>4. Doff over gloves</li> <li>5. Open thermal shrouds to access stbd shunt jumper; report Velcro integrity</li> <li>6. BRT to HR 3431</li> </ol> <div data-bbox="808 597 1316 734" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center; background-color: yellow;"><b>CAUTION</b></p> <p style="text-align: center;">Notify MCC if direct sunlight on shunt jumper</p> </div> <ol style="list-style-type: none"> <li>7. Open QD thermal bootie; report Velcro integrity</li> <li>8. Attach RET from crewlock bag to SPDs</li> </ol> <div data-bbox="804 896 1312 1032" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center; background-color: yellow;"><b>CAUTION</b></p> <p style="text-align: center;">If QD leaks significantly during closing, immediately open valve; inform MCC-H</p> </div> <div data-bbox="779 1068 1337 1188" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;"><u>NOTE</u></p> <p style="text-align: center;">Both QD-F210 &amp; F211 will be closed and a leak check performed prior to demating</p> </div> <ol style="list-style-type: none"> <li>9. On MCC GO, Close valves on QDs, per <b>BLOCK A</b>: <ul style="list-style-type: none"> <li><input type="checkbox"/> QD F211 (inboard, mated to M4)</li> <li><input type="checkbox"/> QD F210 (outboard, mated to M3)</li> </ul> </li> <li>10. Wait 3 min for MCC-H to perform NH<sub>3</sub> leak check</li> </ol>	<p><u>CONFIGURE VENT TOOLS (00:30)</u></p> <ol style="list-style-type: none"> <li>1. Translate to vent tool extension bag location on S0 face 2 (attached to handrails 3425, 3430) - Fairlead at face 1 nadir handrail at ISS marker 7050 w/ wire tie</li> <li>2. Perform glove inspection</li> <li>3. Retrieve vent tool w/ vent tool extension</li> <li>4. Attach MUT EE to vent tool</li> <li>5. Attach MUT EE to S0 HR 3424 on nadir side of Face 2</li> <li>6. Retrieve vent tool adapter</li> <li>7. Remove cap from vent tool adapter</li> <li>8. Remove cap from vent tool</li> <li>9. Mate vent tool adapter to vent tool, per <b>BLOCK D</b> (no thermal bootie)</li> <li>10. Open vent tool valve per <b>BLOCK E</b></li> <li>11. Translate to face 6; transfer vent tool to EV1 or tether to nearby structure</li> <li>12. Perform glove inspection</li> </ol>

## REMOVE S0 STBD NH3 SHUNT JUMPER (01:20)

IV	EV1 (FF)	EV2 (FF)
	<p>11. During wait, prep one end of wire tie from crewlock bag to jumper for stowage  - Single long, around one jumper bail end</p> <p>12. Tether to shunt jumper</p> <div data-bbox="766 418 1325 552" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u></p> <p>Venting steps will immediately follow remove; install only 1 thermal bootie</p> </div> <p>13. On MCC go, demate QDs, per <b>BLOCK C</b>:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> QD F211 (inboard, mated to M4)</li> <li><input type="checkbox"/> QD F210 (outboard, mated to M3)</li> </ul> <p><u>VENT/STOW SHUNT JUMPER (00:50)</u></p> <p>14. Receive vent tool adapter/vent tool from EV2</p> <p>15. <input type="checkbox"/> Mate vent tool adapter to shunt jumper, per <b>BLOCK D</b></p> <div data-bbox="766 893 1272 1029" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center; background-color: red; color: black;"><b>WARNING</b></p> <p>Next step will vent ammonia from shunt jumper. Verify EV2 clear.</p> </div> <p>16. <input type="checkbox"/> Open QD valve per <b>BLOCK E</b> (no bootie)</p> <p>17. Wait 1 minute for jumper venting</p> <p>18. <input type="checkbox"/> Close valve on jumper, per <b>BLOCK B</b></p> <p>19. <input type="checkbox"/> Demate jumper, per <b>BLOCK C</b></p> <p>20. Reinstall QD booties on jumper</p> <p>21. Stow jumper onto S0 truss beam</p> <ul style="list-style-type: none"> <li>- Utilize 2<sup>nd</sup> wire-tie (2 total separate wire-ties)</li> <li>- Each wire-tie must have three 180° twists</li> </ul> <p>22. Translate to vent tool extension bag (S0 face 2)</p> <p>23. <input type="checkbox"/> Close vent tool valve, per <b>BLOCK B</b></p> <p>24. <input type="checkbox"/> Demate vent tool adapter from vent tool, per <b>BLOCK C</b> (no bootie)</p> <p>25. Put cap on vent tool</p>	<p><u>FLUID CAP REMOVAL (00:20)</u></p> <ol style="list-style-type: none"> <li>1. Translate to Node 2 aft endcone</li> <li>2. Temp stow crewlock bag #1 at Node 2 HR 0372</li> <li>3. Tether; temp remove/open Node 2 NH<sub>3</sub> MLI cover</li> </ol> <div data-bbox="1434 509 1940 646" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center; background-color: red; color: black;"><b>WARNING</b></p> <p>Position self over caps to minimize possibility of ammonia contamination</p> </div> <ol style="list-style-type: none"> <li>4. Tether to QD pressure caps, remove from Node 2, and inspect for NH<sub>3</sub> crystals: <ul style="list-style-type: none"> <li><input type="checkbox"/> M1 cap</li> <li><input type="checkbox"/> M2 cap</li> </ul> </li> <li>5. Re-install Node 2 NH<sub>3</sub> MLI cover</li> <li>6. Stow caps in crewlock bag</li> <li>7. Retrieve SFT blanket from bag</li> <li>8. Temp stow SFT blanket onto APFR (Lab WIF 12)</li> <li>9. Perform glove inspection</li> </ol>

**REMOVE S0 STBD NH3 SHUNT JUMPER (01:20)**

IV	EV1 (FF)	EV2 (FF)
	26. Put caps on vent tool adapter 27. Stow vent tool adapter, vent tool, and vent tool extension in vent tool extension bag 28. Perform glove inspection	

## P1 SFU RECONFIG (00:20)

IV	EV1 (FF)	EV2 (FF)
<p>1. IV: On EV GO, give MCC-H go for power up</p>		<p><u>P1 SFU RECONFIG (00:20)</u></p> <ol style="list-style-type: none"><li>1. Translate to P1 SFU Panel A123 on zenith radiator<ul style="list-style-type: none"><li>- Fairlead at ISS marker 8100 adj tether</li></ul></li><li>2. Doff over gloves</li><li>3. Reconfigure power connector:<ul style="list-style-type: none"><li><input type="checkbox"/> Demate P752 from J752</li><li><input type="checkbox"/> Demate dead face connector from J703</li><li><input type="checkbox"/> Mate P752 to J703</li><li><input type="checkbox"/> Install dead face connector onto J752</li></ul></li><li>4. Notify IV: Reconfig complete</li><li>5. Perform glove inspection</li></ol>

## RELOCATE NODE 2 LOOP A FLUID TRAY (01:45)

IV	EV1	EV2								
<table border="1"><thead><tr><th>Bolt</th><th>Turns</th></tr></thead><tbody><tr><td>1</td><td></td></tr><tr><td>7</td><td></td></tr><tr><td>10</td><td></td></tr></tbody></table>	Bolt	Turns	1		7		10		<p><u>DEMATE TRAY FLUID QDS FROM TRAY (00:10)</u></p> <p>1. Translate to Loop A tray near Bolt 10</p> <p>2. BRT to HR 3458</p> <p>3. Demate fluid QDs from fluid tray, per <b>BLOCK C</b>:</p> <p>    <input type="checkbox"/> F100 from M3</p> <p>    <input type="checkbox"/> F101 from M4</p> <p>4. Restrain fluid QDs via long wire tie</p> <p><u>RELEASE STANCHION BOLTS (00:25)</u></p> <p>5. <b>PGT: B7, CCW2, 30.5 (25.5 ft-lb, 30 RPM) 2-in ext</b></p> <p>6. <input type="checkbox"/> Release Bolt 1</p> <p>    11-15 turns, until bolt releases</p> <p>7. Configure PGT w/ 9-in ext; stow 2-in ext on caddy</p> <p>8. Translate stbd to Bolt 8</p> <p>9. Perform bolt check on Bolt 8 (spring loaded)</p> <p>10. BRT to HR 3425 for Bolt 7 access</p>	<p><u>DEMATE TRAY FLUID QDS FROM S0 (00:20)</u></p> <p>1. Translate to port end of tray</p> <p>2. BRT to HR 3484</p> <p>3. Demate fluid QDs from S0, per <b>BLOCK C</b> (no booties):</p> <p>    <input type="checkbox"/> F108 from M9</p> <p>    <input type="checkbox"/> F109 from M10</p> <p>4. Install jettison stowage bag around QDs (restrain fluid QDs and bag via 2 wire ties, if necessary)</p> <p>    a. Undo adj tether from around bag; attach tether to port tether point on fluid tray handhold</p> <p>        - Verify eq hook on adj tether will not interfere with RET eq hook used during tray relocate; if two eq hooks will not fit, route adj tether to stbd tether point on handhold</p> <p>    b. Unfold bag; routed 2<sup>nd</sup> adj tether around fluid tray and attach to itself</p> <p>    c. Install jettison stowage bag around fluid QDs; pull bag over as much of tray as possible</p> <p>    d. Cinch drawstring</p> <p><u>RELEASE STANCHION BOLTS (00:25)</u></p> <p>5. BRT to HR 3458 for Bolt 10 access</p> <p>6. Configure PGT w/ 9-in ext</p> <p>7. <b>PGT: B7, CCW2, 30.5</b></p>
	Bolt	Turns								
1										
7										
10										

## RELOCATE NODE 2 LOOP A FLUID TRAY (01:45)

IV	EV1	EV2
	<p>11. <input type="checkbox"/> Attach RET to tray handhold tether point</p> <p>12. Give EV2 GO for Bolt 10 release</p> <p>On EV2 GO:</p> <p>13. <b>PGT: B7, CCW2, 30.5 (25.5 ft-lb, 30 RPM) 9-in ext</b></p> <p>14. <input type="checkbox"/> Release Bolt 7 19.5 - 21.5 turns, until bolt releases - No tray soft dock</p> <p>15. Preconfigure PGT [B7, CW2, 30.5] for tray install</p> <p>16. Stow PGT on swing arm</p>	<p><b>(25.5 ft-lb, 30 RPM) 9-in ext</b></p> <p>8. Perform bolt check on Bolt 9 (spring loaded)</p> <p>On EV1 Go:</p> <p>9. <input type="checkbox"/> Release Bolt 10 11.5 - 13.5 turns, until bolt releases</p> <p>10. Remove 9-in ext from PGT; stow on socket caddy</p> <p>11. If not already done, preconfigure two adj tethers for tray relocation - One adj tether to tether point on port end of fluid tray handhold, other tether around tray</p> <p>12. If not already done, install jettison stowage bag around QDs (restrain fluid QDs and bag via 2 wire ties, if necessary)</p> <p>a. Undo adj tether from around bag; attach tether to port tether point on fluid tray handhold</p> <p>b. Unfold bag; routed 2<sup>nd</sup> adj tether around fluid tray and attach to itself</p> <p>c. Install jettison stowage bag around fluid QDs; pull bag over as much of tray as possible</p> <p>d. Cinch drawstring</p> <p>13. Give EV1 GO for Bolt 7 release - No tray soft dock</p>

## RELOCATE NODE 2 LOOP A FLUID TRAY (01:45)

IV	EV1	EV2
	<p><u>RELOCATE FLUID TRAY TO LAB</u> (00:30)</p> <p>17. On GO with EV2, remove fluid tray 18. Perform tray mass handling</p> <p>19. Mnvr fluid tray down to EV2 20. Verify EV2 tethered to; release RET from fluid tray 21. Translate to HR 3432 (short horiz HR); attach BRT 22. Receive tray from EV2; attach RET</p> <p>23. Mnvr fluid tray to EV2 24. Verify EV2 tethered to; release tether from fluid tray 25. Translate to aft end of Lab stbd avionics tray 26. BRT to handhold on aft face of avionics tray 27. Receive tray from EV2 28. Mnvr tray to soft dock position</p>	<p><u>RELOCATE FLUID TRAY TO LAB</u> (00:30)</p> <p>14. On GO with EV1, remove fluid tray 15. Perform tray mass handling 16. Verify EV1 tethered to tray; if tethered to tray, release RET 17. Translate to HR 3467 (short vert HR under MBSU) 18. Attach BRT and face body aft/ISS stbd 19. Receive tray from EV1; attach RET</p> <p>20. Mnvr tray to EV1 (moving tray port to allow EV1 access to handhold) 21. Verify EV1 tethered to; release RET from fluid tray 22. Translate to APFR in Lab WIF 12</p> <div data-bbox="1430 847 1990 972"> <p><b>NOTE</b> Verify safety tether routed over fluid tray when positioned at Lab APFR</p> </div> <p>23. BRT to Lab APFR 24. Receive fluid tray from EV1; attach tether 25. Slide tray toward ISS fwd/stbd to clear EV1's translation path</p> <p>26. Mnvr fluid tray to EV1 27. Mnvr tray to soft dock position - Translate along APFR ingress aid</p>

## RELOCATE NODE 2 LOOP A FLUID TRAY (01:45)

IV	EV1	EV2												
<table><tr><th>Bolt</th><th>Turns</th><th>Torque</th><th>Green LED</th></tr><tr><td>7</td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td></tr></table>	Bolt	Turns	Torque	Green LED	7				10				<p><u>ATTACH TRAY TO LAB</u> (00:30)</p> <p>29. Align tray with avionics tray soft-dock on stanchion 7</p> <p>30. Soft-dock stanchion at Bolt 7 to avionics tray</p> <p>31. <b>PGT: B7, CW2, 30.5 (25.5 ft-lb, 30 RPM) 9-in ext</b></p> <p>32. <input type="checkbox"/> Fasten Bolt 7 19-20.5 turns, until bolt fully engages</p> <p>33. Remove 9-in ext; stow on caddy</p> <p>34. Translate to lab stanchion</p> <div><p><b>CAUTION</b></p><p>No red band may be visible on waist tether prior to local tethering to gap spanner.</p></div> <p>35. Assist EV2 w/ Bolt 10 engagement</p>	<p><u>ATTACH TRAY TO LAB</u> (00:30)</p> <p>28. Align tray with avionics tray soft-dock on stanchion 10</p> <p>29. Move tray as needed to assist EV1</p> <p>Once Bolt 7 engaged:</p> <p>30. Release RET from tray</p> <p>31. Verify APFR at 11, QQ, L, 12</p> <p>32. Ingress Lab APFR</p> <p>33. Verify safety tether and QDs 100 and 101 clear of tray</p> <p>34. Retrieve SFT blanket <input type="checkbox"/> stow adj tether on self <input type="checkbox"/> stow RET on self</p> <p>35. Install blanket onto tray (aft of bolt 10)</p> <p>a. Install long strap between the Lab (long) section of the fluid tray and the avionics tray, aft of bolt 10</p> <p>b. Route long strap back up between the fluid tray and upper section (BOB) latch; attach to Velcro on cover</p> <p>c. Verify that the “little dog house” (panel A516, M3 connector cover) is fwd of the “big dog house” (M4 dummy connector cover) – Note that “Fwd” mark on blanket is incorrect, and should be “Aft”</p> <p>36. Soft-dock stanchion at Bolt 10 to avionics tray</p> <p>37. Configure PGT w/ 9-in ext</p>
Bolt	Turns	Torque	Green LED											
7														
10														

RELOCATE NODE 2 LOOP A FLUID TRAY (01:45)

IV	EV1	EV2
	36. Perform glove inspection	38. <b>PGT: B7, CW2, 30.5 (25.5 ft-lb, 30 RPM) 9-in ext</b> 39. <input type="checkbox"/> Fasten Bolt 10 19-20.5 turns, until bolt fully engages 40. Remove 9-in ext; stow on caddy 41. Perform glove inspection

## DEPLOY/MATE NODE 2 LOOP A FLUID TRAY (02:15)

IV	EV1	EV2
	<p><u>PREP TRAY FOR HINGE SECTION DEPLOY</u> (00:15)</p> <ol style="list-style-type: none"> <li>1. Release Velcro strap securing hinge blanket in place</li> <li>2. Release remaining MLI at hinge location</li> </ol> <p><u>DEPLOY HINGED SECTION</u> (00:10)</p> <ol style="list-style-type: none"> <li>3. Translate to S0 fluid tray attachment location</li> <li>4. BRT to HR 3431 for deploy</li> </ol> <div data-bbox="741 837 1346 938" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u></p> <p>Verify safety tether stbd of BOB during deploy</p> </div> <ol style="list-style-type: none"> <li>5. As necessary, open S0 shroud to expose attachment fitting and fluid connector panel (where shunt jumper attached)</li> <li>6. Attach latch assembly on fluid tray to S0 fitting</li> </ol> <div data-bbox="779 1133 1339 1274" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u></p> <p>Wait to insert fluid tray PIP pin until after EV2 has performed a fluid QD reach assessment at the BOB</p> </div>	<p><u>PREP TRAY FOR HINGE DEPLOY</u> (00:15)</p> <ol style="list-style-type: none"> <li>1. Release wire-tie securing fluid QDs</li> <li>2. Retrieve adj tethers (2) from tray</li> <li>3. Egress APFR; translate to crewlock bag</li> <li>4. Retrieve adj tether with SPDs from crewlock bag (2) and stow on MWS</li> <li>5. Stow adj tethers (2) and wire ties in crewlock bag</li> <li>6. Release MLI on tray</li> <li>7. Release hinge latch PIP-pin</li> <li>8. Release hinge latch</li> </ol> <p><u>DEPLOY HINGED SECTION</u> (00:10)</p> <ol style="list-style-type: none"> <li>9. Position self to deploy hinged section</li> <li>10. Translate aft along tray while pushing upper section (BOB) to EV1</li> </ol>

## DEPLOY/MATE NODE 2 LOOP A FLUID TRAY (02:15)

IV	EV1	EV2
	<p><u>VENT N2 FROM TRAY HOSES (00:40)</u></p> <div data-bbox="804 334 1283 448" style="border: 2px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center; background-color: yellow; margin: 0;"><b>CAUTION</b></p> <p style="margin: 0;">Do not begin venting clock until hinge connections completed.</p> </div> <p>7. Retrieve N<sub>2</sub> vent tool from crewlock bag #4</p> <p>8. <input type="checkbox"/> Mate N<sub>2</sub> vent tool to F100 (supply) per <b>BLOCK D</b></p> <p>9. Open vent tool on fluid tray umbilical:  <input type="checkbox"/> Open valve on F100, per <b>BLOCK E</b></p> <p>10. Wait 1 minute for venting</p> <p>11. <input type="checkbox"/> Close valve on F100, per <b>BLOCK B</b></p> <p>12. <input type="checkbox"/> Demate N<sub>2</sub> vent tool, per <b>BLOCK C</b> (no booties)</p> <p>13. <input type="checkbox"/> Mate N<sub>2</sub> vent tool to F101 (return), per <b>BLOCK D</b></p> <p>14. Open vent tool on fluid tray umbilical:  <input type="checkbox"/> Open valve on F101, per <b>BLOCK E</b></p> <p>15. Wait 1 minute for venting</p> <p>16. <input type="checkbox"/> Close valve on F101, per <b>BLOCK B</b></p> <p>17. <input type="checkbox"/> Demate N<sub>2</sub> vent tool, per <b>BLOCK C</b></p> <p>18. Stow N<sub>2</sub> vent tool in crewlock bag #4</p> <p>19. Perform glove inspection</p>	<p><u>MATE/OPEN HINGE QDS (00:40)</u></p> <p>11. Release 1st TA-clamps on hose for each of the 2 QDs</p> <p>12. BRT to square handrail on BOB</p> <p>13. Remove QD pressure caps from fluid tray; stow caps in trash bag  <input type="checkbox"/> M1 cap  <input type="checkbox"/> M2 cap</p> <p>14. <input type="checkbox"/> Demate F188 from M5, per <b>BLOCK C</b> (no bootie step, no locking collar step)</p> <p>15. <input type="checkbox"/> Mate F188 to M1, per <b>BLOCK D</b></p> <p>16. <input type="checkbox"/> Open valve on F188 and install SPD, per <b>BLOCK F</b></p> <p>17. <input type="checkbox"/> Demate F189 from M6, per <b>BLOCK C</b> (no bootie step, no locking collar step)</p> <p>18. <input type="checkbox"/> Mate F189 to M2, per <b>BLOCK D</b></p> <p>19. <input type="checkbox"/> Open valve on F189 and install SPD, per <b>BLOCK F</b></p> <p>20. Perform glove inspection</p>

## DEPLOY/MATE NODE 2 LOOP A FLUID TRAY (02:15)

IV	EV1	EV2
	<p><u>MATE S0 FLUID QDS</u> (00:40)</p> <p>20. Open TA-clamps as necessary</p> <div data-bbox="758 383 1318 492" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u> Verify safety tether clear prior to connector mates</p> </div> <p>21. Mate QDs on S0 end of tray fluid QDs, per <b>BLOCK D</b>:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Mate QD F101 (inboard) to M4</li> <li><input type="checkbox"/> Mate QD F100 (outboard) to M3</li> </ul> <p>22. If open, re-engage TA-clamps on ammonia rigid line prior to QD opening</p> <p>23. If released, relatch BOB to S0</p>	<p><u>MATE NODE 2 FLUID QDS</u> (00:40)</p> <p>21. Translate to Node 2</p> <p>22. Remove Node 2 NH<sub>3</sub> stanchion MLI cover</p> <p>23. Stow cover in crewlock bag</p> <p>24. Retrieve adj tether with SPDs (2); stow adj tether (that had SPDs)</p> <p>25. Release TA-clamps from fluid umbilicals as necessary</p> <p>26. BRT at HR 0373</p> <p>27. Remove jettison stowage bag and wire ties; stow in crewlock bag</p> <div data-bbox="1400 662 1961 771" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><u>NOTE</u> Verify safety tether clear prior to connector mates</p> </div> <p>28. Mate fluid QDs to Node 2 NH<sub>3</sub> connector panel, per <b>BLOCK D</b>:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Mate QD F108 to M1 (nadir)</li> <li><input type="checkbox"/> Mate QD F109 to M2 (zenith)</li> </ul> <p>29. If open, re-engage TA-clamps on ammonia rigid line prior to QD opening</p>

## DEPLOY/MATE NODE 2 LOOP A FLUID TRAY (02:15)

IV	EV1	EV2
<ol style="list-style-type: none"> <li>1. IV: Verify with MCC-H, GO to open fluid QD valves</li> <li>2. IV: WVS, EV2 - center cam (Node 2 fluid QDs)</li> <li>3. IV: WVS, EV1 - center cam (Shunt jumper stowage &amp; S0 fluid QDs)</li> </ol>	<p><u>OPEN S0 FLUID QDS</u> (00:30)</p> <div data-bbox="760 345 1318 466"> <p><b>NOTE</b> Do not open valves until both sides of fluid tray mated</p> </div> <div data-bbox="804 487 1283 602"> <p><b>CAUTION</b> Both Node 2 QDs must be opened prior to opening the S0 QDs.</p> </div> <p>Once QDs F108 and F109 open:</p> <ol style="list-style-type: none"> <li>24. Open valves on S0 end of tray fluid QDs, per <b>BLOCK F</b>: <ul style="list-style-type: none"> <li><input type="checkbox"/> Open QD F101/M4 (inboard)</li> <li><input type="checkbox"/> Open QD F100/M3 (outboard)</li> </ul> </li> <li>25. Perform WVS closeout</li> <li>26. Close any TA-clamps opened</li> <li>27. If not already performed, insert fluid tray latch PIP-pin into latch fitting</li> <li>28. Close S0 MLI cover</li> <li>29. Secure closeout cover flaps along underside of upper tray blanket</li> <li>30. Secure any remaining tray MLI at S0</li> <li>31. Perform glove inspection</li> </ol>	<p><u>OPEN NODE 2 FLUID QDS</u> (00:30)</p> <div data-bbox="1411 345 1969 466"> <p><b>NOTE</b> Do not open valves until both sides of fluid tray mated</p> </div> <div data-bbox="1379 487 2001 634"> <p><b>CAUTION</b> QDs with 90 deg bend are prone to galling. Ensure no side loads when opening valve. Limit handling loads to &lt;25 lb after opening valve.</p> </div> <p>On MCC GO:</p> <ol style="list-style-type: none"> <li>30. Open valves on Node 2 tray fluid QDs, per <b>BLOCK F</b> (no thermal bootie steps): <ul style="list-style-type: none"> <li><input type="checkbox"/> Open QD F108/M1 (nadir)</li> <li><input type="checkbox"/> Open QD F109/M2 (zenith)</li> </ul> </li> <li>31. Perform WVS closeout</li> <li>32. Close MLI around fluid QDs</li> <li>33. Secure MLI around Bolt 10 <ul style="list-style-type: none"> <li>a. Unwrap MLI "burrito" from zenith inboard portion of tray</li> <li>b. Tuck aft corner of "burrito" MLI under Bolt 10 handle</li> </ul> </li> <li>34. Secure SFT Blanket <ul style="list-style-type: none"> <li>a. Slide blanket fwd such that the pockets ("big dog house" and "little dog house") fit over respective dummy male QD panels</li> <li>b. Route short strap underneath tether point on aft end of Bolt 10 handle; mate to Velcro on blanket Note that Bolt 10 handle and bolting interface should still be exposed and uncovered</li> </ul> </li> <li>35. Perform glove inspection</li> </ol>

## AVIONICS UMBILICALS / FLUID LINE HEATER UMBILICALS

IV	EV1	EV2
<p>4. IV: WVS, EV1 - center cam (heater lines)</p>	<p><u>CONNECT FLUID LINE HEATER UMBILICALS</u> (00:20)</p> <ol style="list-style-type: none"> <li>On avionics tray, open 1 TA-clamp, release wire harness (W9104); close TA-clamp</li> <li>Demate P270 and P272 (panel A149)</li> <li>At hinged end, remove connector caps from J270 and J272 (Panel A151 - zenith of hinge)</li> <li>Attach caps to panel A149 on avionics tray</li> <li>Mate connectors to fluid tray receptacle panel A151: <ul style="list-style-type: none"> <li><input type="checkbox"/> P270 to J270</li> <li><input type="checkbox"/> P272 to J272</li> </ul> </li> <li>Perform WVS closeout</li> <li>Secure hinge blanket <ul style="list-style-type: none"> <li>- Wrap Velcro strap at hinge around zenith avionics panel (A149)</li> <li>- Use short wire-tie to secure Velcro strap</li> </ul> </li> <li>Verify all fluid tray MLI secured</li> <li>Translate to crewlock bag #1 (where EV2 temp stowed it)</li> <li>Retrieve wire tie caddy; stow on self</li> </ol>	<p><u>CONNECT PORT AVIONICS UMBILICALS TO NODE 2</u> (00:50)</p> <ol style="list-style-type: none"> <li>Stow adj tether (that had SPDs) in crewlock bag #1, if desired</li> <li>Retrieve crewlock bag #1; stow on BRT</li> <li>Translate to port side of Node 2</li> <li>Temp stow crewlock bag #1; inform IV and EV1 of location (EV1 will need wire-tie caddy)</li> <li>Remove Node 2 avionics MLI cover</li> <li>Translate to crewlock bag #1</li> <li>Stow MLI cover</li> <li>Retrieve avionics umbilicals from temp stow location</li> </ol> <div data-bbox="1444 732 1957 935" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><b>CAUTION</b></p> <p>P664 powers the HX valve, and the inhibits to that connection will be removed upon connection. Inform MCC if demate of P664 is required after inhibits removed.</p> </div> <ol style="list-style-type: none"> <li>Mate avionics umbilicals to Node 2 (BRT to HR 0330, if necessary). The following order is zenith to nadir on the Node 2 panel: <ul style="list-style-type: none"> <li><input type="checkbox"/> P664 to J664 (HX valves)</li> <li><input type="checkbox"/> P665 to J665</li> <li><input type="checkbox"/> P660 to J660</li> <li><input type="checkbox"/> P661 to J661</li> <li><input type="checkbox"/> P662 to J662</li> <li><input type="checkbox"/> P663 to J663</li> <li><input type="checkbox"/> P101 to J101</li> <li><input type="checkbox"/> P105 to J105</li> <li><input type="checkbox"/> P104 to J104</li> <li><input type="checkbox"/> P103 to J103</li> <li><input type="checkbox"/> P102 to J102</li> </ul> </li> </ol>

**AVIONICS UMBILICALS / FLUID LINE HEATER UMBILICALS**

IV	EV1	EV2
5. IV: Notify MCC-H go for aliveness test 6. IV: WVS, EV2 - center cam (avionics umbilicals)		10. Notify IV, all port avionics umbilicals mated 11. Perform WVS closeout

## PMA2-TO-NODE2 PRIMARY UMBILICALS (00:35)

IV	EV1	EV2
<ol style="list-style-type: none"> <li>1. IV: WVS, EV1 - center cam (PMA2/Node 2 primary umbilicals)</li> <li>2. IV: Notify MCC-H go for aliveness test</li> </ol>	<p><u>CONNECT PMA2 PRIMARY UMBILICALS (00:35)</u></p> <ol style="list-style-type: none"> <li>1. Release umbilicals from PMA2 temp stow location</li> <li>2. Translate bundle to Node 2 connector panel (ISS port/zenith)</li> </ol> <div data-bbox="756 485 1358 657" style="border: 2px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center; background-color: yellow; margin: 0;"><b>CAUTION</b></p> <ol style="list-style-type: none"> <li>1. Avoid bend radii &lt; 10 times cable diameter</li> <li>2. Avoid pulling on cable during mate/demate</li> <li>3. Bail linkage on P613 is broken and will require modified technique</li> </ol> </div> <ol style="list-style-type: none"> <li>3. Temp secure umbilical bundle via wire tie to HR 0326</li> <li>4. Connect umbilicals to Node 2 connector panel in the following order:               <ul style="list-style-type: none"> <li><input type="checkbox"/> P612 / J612</li> <li><input type="checkbox"/> P611 / J611</li> <li><input type="checkbox"/> P610 / J610</li> <li><input type="checkbox"/> P613 / J613 (bail linkage broken)</li> </ul> </li> <li>5. Perform WVS photo closeout of connectors</li> <li>6. Slide thermal covers over connectors</li> <li>7. Secure umbilicals in clamps and with wire-ties to keep them secured with a low profile (suggested locations):               <ul style="list-style-type: none"> <li><input type="checkbox"/> Node 2 handrail 0320</li> <li><input type="checkbox"/> Node 2 handrail 0325</li> <li><input type="checkbox"/> TA-clamps on Node 2 endcone shields</li> </ul> </li> <li>8. Notify IV all PMA2/Node 2 primary umbilicals mated</li> <li>9. Verify all TA-clamps are closed</li> </ol>	

## US EVA 11 CLEANUP/INGRESS (00:15)

IV	EV1	EV2
	<p><u>CLEANUP/INGRESS (00:15)</u></p> <ol style="list-style-type: none"> <li>1. Perform glove inspection</li> <li>2. Donn over gloves</li> <li>3. Translate to Node 2 aft endcone</li> <li>4. Retrieve crewlock bag at shunt jumper location (bag #2)</li> <li>5. Translate to safety tether anchor points at top of CETA spur (S0 face 6)</li> <li>6. Perform tool inventory</li> <li>7. Verify EV2 anchored to airlock via waist tether</li> <li>8. Unhook EV2's safety tether from S0 HR 3413; connect to own waist tether (daisy chain) <ul style="list-style-type: none"> <li>- Engage crew hook slide lock - L (both)</li> <li>- Verify hook gate closed (both)</li> </ul> </li> <li>9. Unhook own safety tether from S0 handrail 3412; temp stow on self</li> <li>10. Stow crewlock bag #4 in airlock</li> <li>11. Receive APFR 3 (S/N 5) from EV2</li> <li>12. Translate to stbd A/L toolbox; stow APFR (6, XX, F, 12)</li> <li>13. Translate to A/L hatch; ingress</li> <li>14. Remove SCU from stowage pouch</li> <li>15. Remove DCM cover, Velcro to DCM</li> <li>16. SCU-&gt; &lt;-DCM, √SCU locked</li> <li>17. Water – OFF</li> </ol> <div data-bbox="856 1092 1310 1187"> <p><u>CAUTION</u> Do not close hatch until EMU WATER – OFF for 2 min</p> </div> <ol style="list-style-type: none"> <li>18. Close thermal cover, attach Velcro strap</li> <li>19. Verify no hardware blocking hatch</li> <li>20. EV Hatch – verify handle position per hatch decal; close and lock</li> </ol> <p>Go to PRE REPRESS portion of {CREWLOCK DEPRESS/REPRESS CUE CARD} (SODF:ISS EVA SYS: EVA PREP/POST)</p>	<p><u>CLEANUP/INGRESS (00:15)</u></p> <ol style="list-style-type: none"> <li>1. Perform glove inspection</li> <li>2. Donn over gloves</li> <li>3. Retrieve crewlock bag #1</li> <li>4. Undo fairleads: <ul style="list-style-type: none"> <li><input type="checkbox"/> at ISS marker 8100; stow adj tether</li> <li><input type="checkbox"/> at ISS marker 7050; stow wire tie</li> </ul> </li> <li>5. Translate to airlock</li> <li>6. Open A/L thermal cover</li> <li>7. Stow crewlock bag #1 in airlock; ingress</li> <li>8. Attach waist tether (R) to A/L D-ring <ul style="list-style-type: none"> <li>- Engage crew hook slide lock - L</li> <li>- Verify hook gate closed</li> </ul> </li> <li>9. Perform tool inventory</li> <li>10. Transfer APFR 3 (S/N 5) to EV1</li> <li>11. Remove SCU from stowage pouch</li> <li>12. Remove DCM cover, Velcro to DCM</li> <li>13. SCU-&gt; &lt;-DCM, √SCU locked</li> <li>14. Water – OFF</li> </ol> <div data-bbox="1501 1092 1955 1187"> <p><u>CAUTION</u> Do not close hatch until EMU WATER – OFF for 2 min</p> </div>

**GET-AHEAD: RELOCATE VTE BAG FOR US EVA 12 (00:15)**

IV	EV1	EV2
		<p><u>RELOCATE VTE BAG</u> (00:15)</p> <ol style="list-style-type: none"><li>1. Translate to vent tool extension bag on S0 face 2</li><li>2. Relocate bag to ISS port location on S0 face 2<ul style="list-style-type: none"><li>- Between handrails 3537 and 3540</li><li>- Attach to handrail 3528 if desired</li></ul></li><li>3. Verify bag is clear of MT/MBS translation</li></ol>

## GET-AHEAD: RELOCATE APFR FOR US EVA 12 (00:15)

IV	EV1	EV2
		<p><u>APFR RELOCATE</u> (00:15)</p> <ol style="list-style-type: none"><li>1. Translate to APFR on Lab WIF 12 (stbd/zenith, fwd end)</li><li>2. Retrieve APFR; relocate to Lab WIF 11 (port/zenith, fwd end)</li><li>3. Configure APFR [1, QQ, A, 12]<ul style="list-style-type: none"><li>- Verify locking collar black-on-black</li><li>- Perform pull test</li></ul></li><li>4. Rotate ingress aid toward Lab surface</li></ol>

## GET-AHEAD: CONNECT STBD AVIONICS UMBILICALS (00:30)

IV	EV1	EV2
<ol style="list-style-type: none"> <li>IV: Verify with MCC-H, stbd avionics umbilicals inhibited               <ul style="list-style-type: none"> <li>- MBSU 2 RBI 3 &amp; 10 – Open, Close Cmd Inhibit</li> <li>- MBSU 3 RBI 2 &amp; 3 – Open, Close Cmd Inhibit</li> <li><del>- RPCM S01A_D RPC 2 – Open, Close Cmd Inhibit</del></li> <li>- RPCM S02B_D RPC 4 &amp; 5 – Open, Close Cmd Inhibit</li> </ul> </li> <li>IV: Notify MCC-H go for aliveness test</li> <li>IV: WVS, EV2 - center cam (avionics umbilicals)</li> </ol>	<p><u>CONNECT STBD AVIONICS UMBILICALS TO NODE 2 (00:30)</u></p> <ol style="list-style-type: none"> <li>Remove MLI and stow in crewlock bag #4</li> <li>Retrieve avionics umbilicals from temp stow location</li> <li>Mate avionics umbilicals to Node 2:               <ul style="list-style-type: none"> <li><input type="checkbox"/> P674 to J674</li> <li><input type="checkbox"/> P673 to J673</li> <li><input type="checkbox"/> P671 to J671</li> <li><input type="checkbox"/> P672 to J672</li> <li><input type="checkbox"/> P670 to J670</li> </ul> </li> <li>Notify IV, all stbd avionics umbilicals mated</li> <li>Perform WVS closeout</li> <li>Verify all fluid tray MLI secured</li> </ol>	

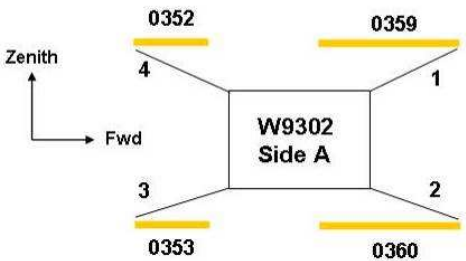
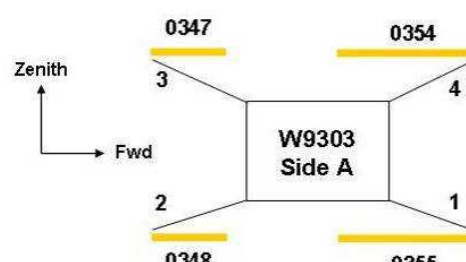
## GET-AHEAD: CONNECT PMA2 REDUNDANT UMBILICALS (00:35)

IV	EV1	EV2			
<p><u>NOTE</u> No inhibits required for PMA2 redundant umbilical mates</p> <p>1. IV: WVS, EV1 - center cam (PMA2/Node 2 primary umbilicals)</p> <p>2. IV: WVS, EV1 - center cam (PMA2/Node 2 primary umbilicals)</p> <p>3. IV: Notify MCC-H go for aliveness test</p>	<p><u>CONNECT PMA2 REDUNDANT UMBILICALS</u> (00:35)</p> <p>1. Translate to PMA2 redundant umbilicals (ISS fwd/zenith side)</p> <p>2. Release umbilicals from PMA2 temp stow location</p> <p>3. Translate bundle to Node 2 connector panel (ISS stbd/zenith)</p> <table border="1"><tr><td><b>CAUTION</b></td></tr><tr><td>1. Avoid bend radii &lt; 10 times cable diameter</td></tr><tr><td>2. Avoid pulling on cable during mate/demate</td></tr></table> <p>4. Temp secure umbilical bundle via wire tie to nearby handrail</p> <p>5. Remove connector cover MLI; stow in trash bag</p> <p>6. Verify safety tether clear</p> <p>7. Connect umbilicals to Node 2 in any order: BRT at HR 0359:</p> <ul style="list-style-type: none"><li><input type="checkbox"/> P609 / J609</li><li><input type="checkbox"/> P614 / J614</li><li><input type="checkbox"/> Perform WVS photo closeout</li><li><input type="checkbox"/> Slide thermal covers over zero-g connectors at Node 2 connector panel</li></ul> <p>BRT at HR 0360:</p> <ul style="list-style-type: none"><li><input type="checkbox"/> P615 / J615</li><li><input type="checkbox"/> P616 / J616</li><li><input type="checkbox"/> Perform WVS photo closeout</li><li><input type="checkbox"/> Slide thermal covers over zero-g connectors at Node 2 connector panel</li></ul> <p>8. Notify IV all PMA2/Node 2 redundant umbilicals mated</p>	<b>CAUTION</b>	1. Avoid bend radii < 10 times cable diameter	2. Avoid pulling on cable during mate/demate	
<b>CAUTION</b>					
1. Avoid bend radii < 10 times cable diameter					
2. Avoid pulling on cable during mate/demate					

**GET-AHEAD: CONNECT PMA2 REDUNDANT UMBILICALS (00:35)**

IV	EV1	EV2
	<div>9. Secure umbilicals in clamps and with wire-ties to keep them secured with a low profile:<div><div><input type="checkbox"/> Node 2 handrail 0328</div><div><input type="checkbox"/> Node 2 handrail 0315</div><div><input type="checkbox"/> PMA2 handrail 0407</div></div></div> <div>10. Verify all TA-clamps are closed</div>	

## GET-AHEAD: SSPTS CABLE DEPLOY (01:00)

IV	EV1	EV2
<p>MCC-H 1. Verify inhibits are in place:</p> <ul style="list-style-type: none"> <li>- DDCU LA1A or LA4A Converter - OFF</li> <li>- DDCU LA2A or LA3B Converter - OFF</li> <li>- RPCM LA1A4A_D RPC 03 - Open; CL CMD INH</li> <li>- RPCM LA2A3B_D RPC 01 - Open; CL CMD INH</li> <li>- RPCM Z13B_A RPC 02 - Open; CL CMD INH</li> <li>- RPCM Z14B_A RPC 02 - Open; CL CMD INH</li> </ul>  	<p><u>W9302 (Between lab HRs 0271 and 0280)</u></p> <ol style="list-style-type: none"> <li>1. Retrieve wire-tie caddy from crewlock bag #1</li> <li>2. Follow EV1 and wire-tie cables to Node 2 HRs as necessary to maintain a clean translation path</li> </ol> <p><u>W9303 (stbd-nadir bag)</u></p> <ol style="list-style-type: none"> <li>3. Retrieve wire-tie caddy</li> <li>4. Follow EV2 and wire-tie cables to Node 2 HRs as necessary to maintain a clean translation path</li> </ol>	<p><u>W9302 (zenith bag)</u></p> <ol style="list-style-type: none"> <li>1. Disconnect straps on W9302</li> <li>2. Tether bag for translation</li> <li>3. Translate across Node 2 to PMA 2</li> <li>4. Tether bag to Node 2 HRs 0352, 0353, 0359, 0360</li> <li>5. Continue translating to PMA2 while releasing cable from side A</li> <li>6. Mate SSPTS J3A to PMA2 P3</li> </ol> <p><u>W9303 (Between Lab HRs 0274 and 0281)</u></p> <ol style="list-style-type: none"> <li>7. Disconnect straps on W9303</li> <li>8. Release wire-tie at Lab HR 0272</li> <li>9. Tether to bag for translation</li> <li>10. Translate across Node 2 to PMA2</li> <li>11. Tether bag to Node 2 HRs 0347, 0348, 0354, 0355</li> <li>12. Continue translating to PMA2 while releasing cable from side A</li> <li>13. Mate SSPTS J16A to PMA2 P16</li> </ol>

**GET-AHEAD: RELOCATE APFR FOR 1E (00:15)**

IV	EV1	EV2
		<p><u>RELOCATE APFR</u> (00:15)</p> <ol style="list-style-type: none"><li>1. Translate to:<ol style="list-style-type: none"><li>a. APFR on Lab WIF 6 (port side) <b><u>OR</u></b></li><li>b. APFR on airlock toolbox w/ safety tether</li></ol></li><li>2. Retrieve APFR</li><li>3. Relocate to Node 2 WIF 14 (fwd endcone nadir)</li><li>4. Configure APFR [____, PP, A, 6]<ul style="list-style-type: none"><li>- Verify locking collar black-on-black</li><li>- Perform pull test</li></ul></li><li>5. If relocated AFPR from Lab WIF 6, return safety tether temp stowed on airlock toolbox APFR back inside</li></ol>

## S0 NH<sub>3</sub> SHUNT JUMPER REMOVAL / P1 SFU CONFIG – TASK DATA

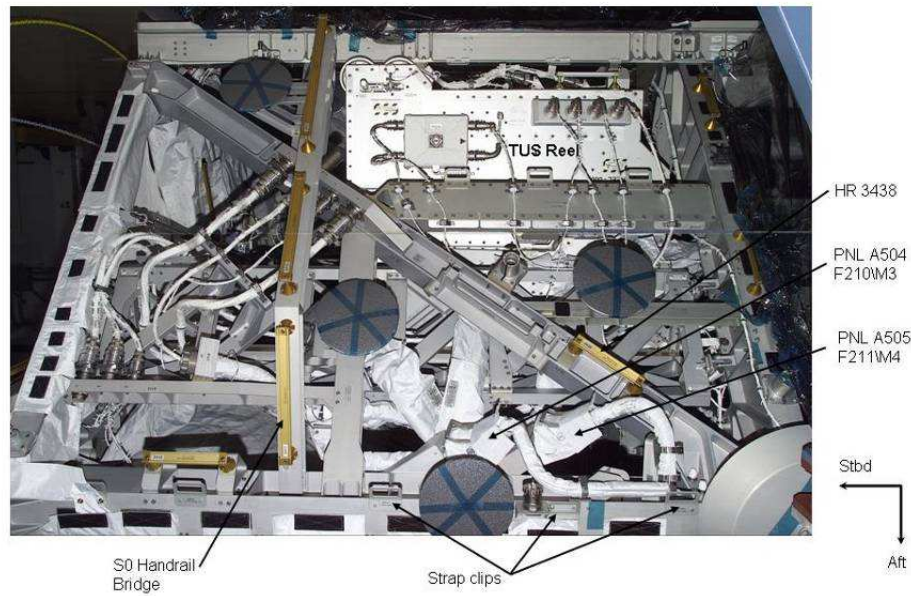


Figure 1. Stbd Shunt Jumper Overview (No Shroud)

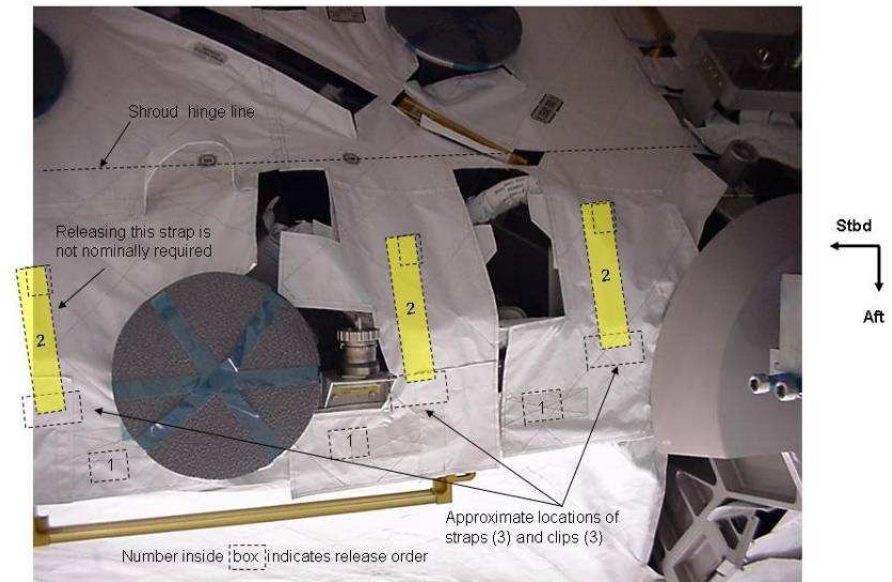


Figure 2. Stbd Shunt Jumper with Shroud Installed

## S0 NH<sub>3</sub> SHUNT JUMPER REMOVAL / P1 SFU CONFIG – TASK DATA

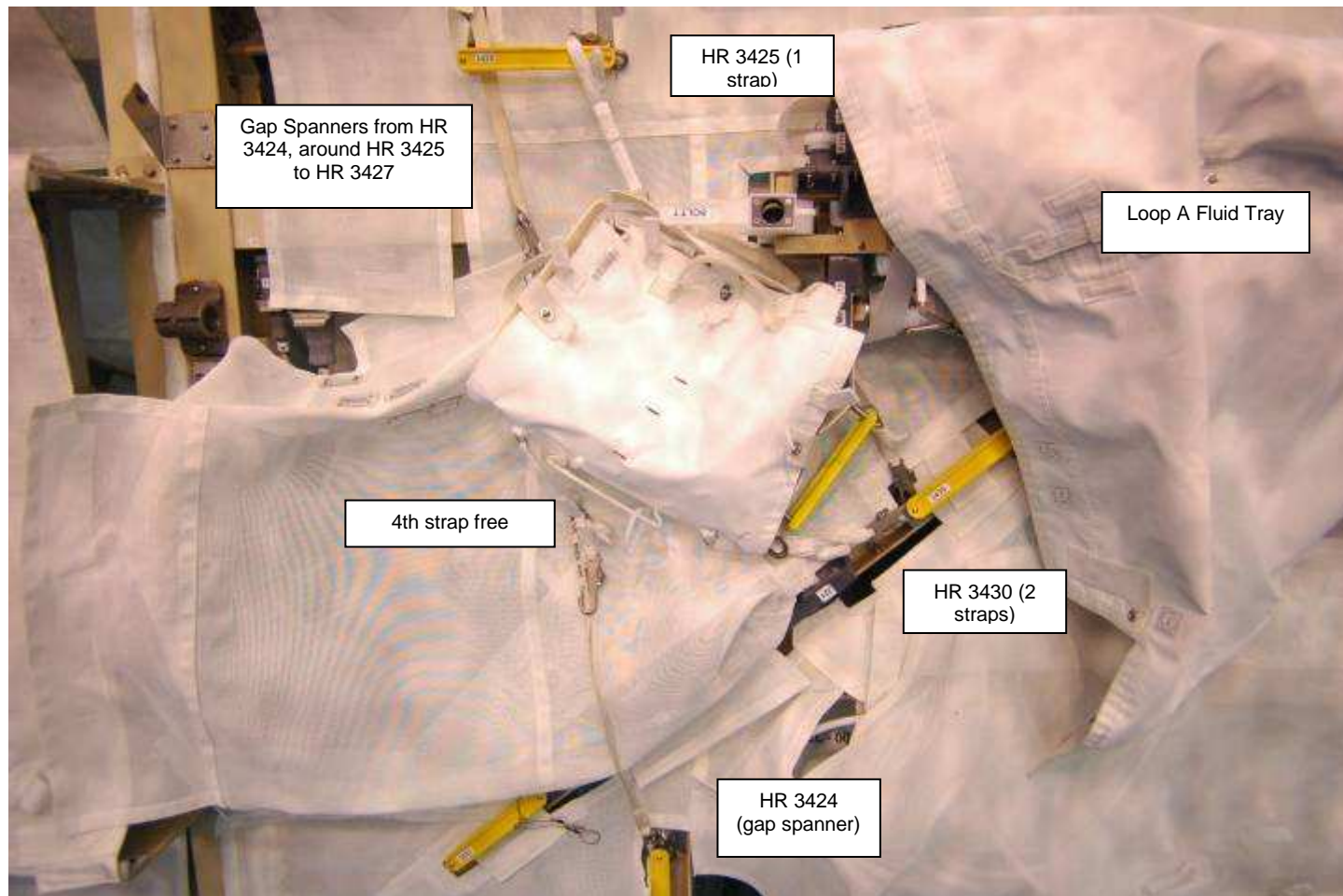


Figure 3. Vent Tool Extender Bag Temp Stow - S0 Face 02

## SHUNT JUMPER REMOVAL / P1 SFU CONFIG - TASK DATA

### Estimated Task Duration:

	With RMS	Without RMS
One EV Crew	N/A	0:20 (P1 SFU) 1:20 (Shunt Jumper)
Two EV Crew	N/A	N/A

### Tools:

EV1 (FF)	EV2 (FF)
Vent tools	N/A
BRT	

### EVA Connectors:

Harness	From	To	Clamps (#)	Conn Size	Function
<b>P752</b>	<b>J752</b>	<b>J703</b>	---	<b>17</b>	<b>POWER TO SFU CHARGE BANK AND RELAY</b>
<b>Dead Face Connector</b>	<b>J703</b>	<b>J752</b>	---	<b>17</b>	

### Note:

- Both QD-F210 & F211 will be closed and a leak check performed prior to demating
- If EV1 ahead of EV2, only close 1 shunt jumper valve. Wait until the vent tool is ready prior to closing the 2<sup>nd</sup> valve
- Venting steps will immediately follow removal of the shunt jumper. Therefore, install only 1 thermal bootie

### Cautions:

- Notify MCC if direct sunlight on shunt jumper
- If QD leaks significantly during closing, immediately open valve; inform MCC-H

### Warnings:

- Position self over Node 2 QD caps during removal to minimize possibility of ammonia contamination
- Verify EV2 clear of vent tool prior venting ammonia from shunt jumper.

SHUNT JUMPER REMOVAL / P1 SFU CONFIG - TASK DATA

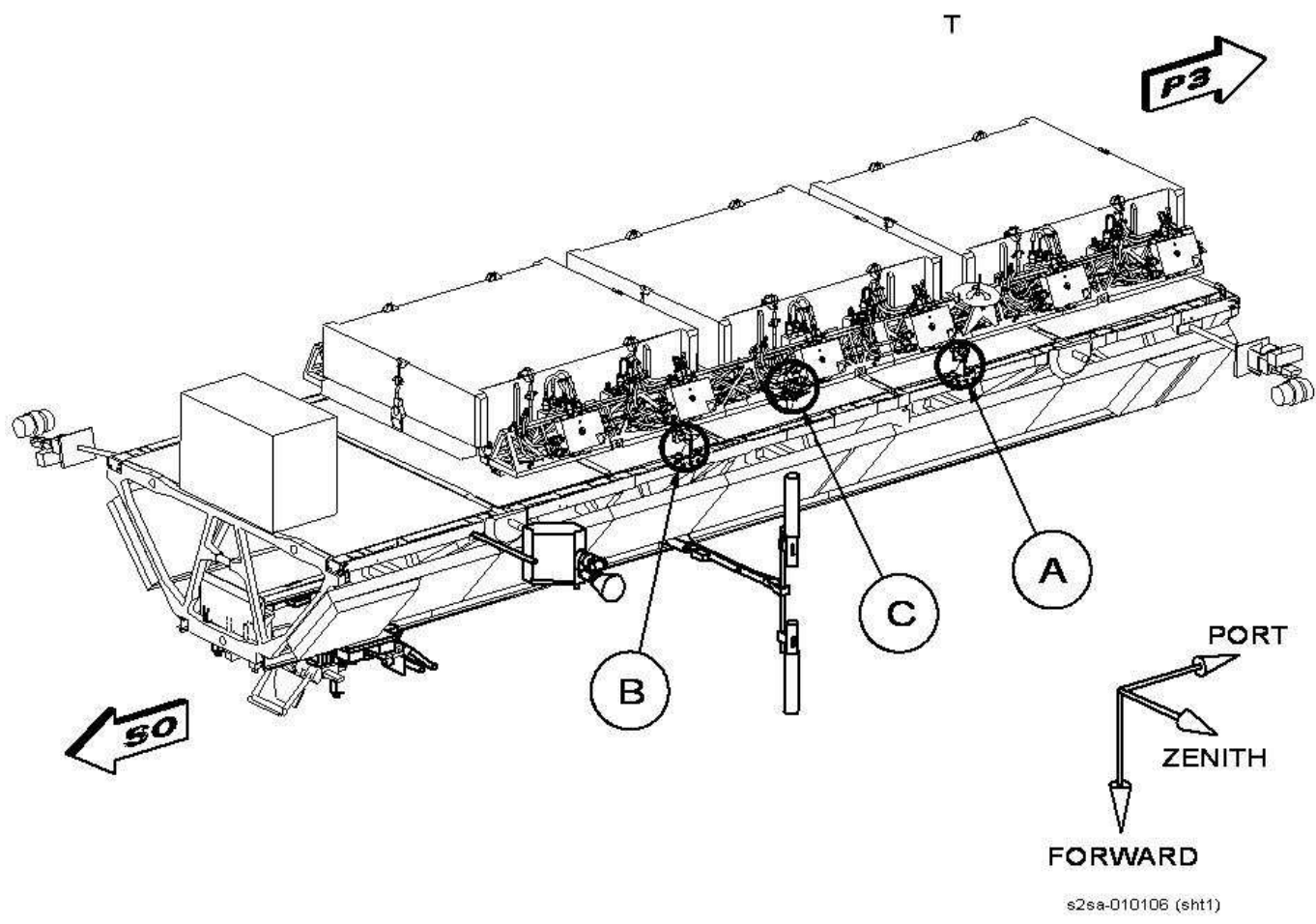
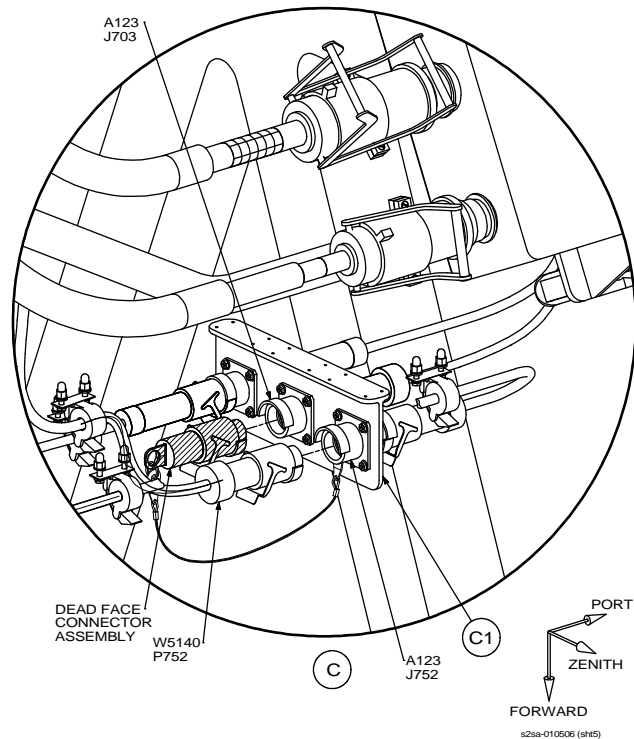


Figure 4. P1 Heat Rejection System Radiator

**S0 NH<sub>3</sub> SHUNT JUMPER REMOVAL / P1 SFU CONFIG – TASK DATA**



**Figure 5. SFU Connectors before reconfig**



**Figure 6. SFU Connectors after reconfig**

## RELOCATE & DEPLOY NODE 2 LOOP A FLUID TRAY – TASK DATA

### Estimated Task Duration:

	With RMS	Without RMS
One EV Crew	N/A	N/A
Two EV Crew	N/A	0:30 (for tray relocate)

### Tools:

EV1 (FF)	EV2 (FF)
PGT	PGT
BRT	BRT
7/16 (wobble) Socket-9 ext	7/16 (wobble) Socket-9 ext
7/16 Socket - 2 ext	Jettison stowage bag
Russian Wire-Tie	Russian Wire-Tie
	Adj tethers (2)

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Ground Torque (ft-lb)	Recommended Release Torque (ft-lb)	Max Expected Release Torque (ft-lb)	Failure Torque (ft-lb)	Recommended Install Torque (ft-lb)	Min Install Torque (ft-lb)	Max Install Torque (ft-lb)	Turns (Clamp-up/Removal)	RPM
Fluid Umbilical Launch Restraints	1	7/16	1	19.2 - 20.0	25.5	22.7	168.2	N/A	N/A	N/A	11 - 15	30
Fluid Umbilical Stanchion Bolts	7	7/16	1	20.0	25.5	34.9	160	25.5	0.7	160	19.5 - 21.5 (Release from S0) 19 - 20.5 (Install on Lab)	30
Fluid Umbilical Stanchion Bolts	10	7/16	1	N/A*	25.5	38.3	160	25.5	0.7	160	11.5 - 13.5 (Release from S0) 19 - 20.5 (Install on Lab)	30

\* Bolt 10 has been release and re-installed on-orbit

### EVA Connectors:

Harness	From	To	Conn Size	Function
W9104-P270	P270 (Dummy Panel)	J270 (Panel A151)	15	Heater Power
W9104-P272	P272 (Dummy Panel)	J272 (Panel A151)	17	Heater Power
P665	Lab	Node 2	13	S0 VCSA Port 11 (f.o.)
P664	Lab	Node 2	25	S0 MDM to HX
P660	Lab	Node 2	25	S0 pwr to DDCU
P661	Lab	Node 2	25	S0 pwr to DDCU
P662	Lab	Node 2	25	S0 pwr to DDCU
P663	Lab	Node 2	25	S0 pwr to DDCU
P101	Lab	Node 2	15	PDGF to USL video (f.o.)
P105	Lab	Node 2	15	PDGF to USL video (f.o.)
P104	Lab	Node 2	25	So pwr to PDGF

## RELOCATE & DEPLOY NODE 2 LOOP A FLUID TRAY – TASK DATA

P103	Lab	Node 2	15	PDGF to USL video (f.o.)
P102	Lab	Node 2	25	S0 pwr to PDGF
P674	Lab	Node 2	25	S0 MDM to HX
P702	Lab	Node 2	25	S0 pwr to CAM
P673	Lab	Node 2	25	S0 pwr to DDCU
P671	Lab	Node 2	25	S0 pwr to DDCU
P672	Lab	Node 2	25	S0 pwr to DDCU
P670	Lab	Node 2	25	S0 pwr to DDCU

### Connector Inhibits:

Task	Inhibit
P270 & P272	RPCM S02B_D RPC 2 - Open, Close Cmd Inhibit
P101	None
P102	RPCM S04B_C RPC3 & 4
P103	None
P104	RPCM S03A_C RPC 1 & 2
P105	None
P660	MBSU 1 RBI 10
P661	MBSU 1 RBI 11
P662	MBSU 4 RBI 2
P663	MBSU 4 RBI 10
P664	RPCM S02B_D RPC 2 RPCM S01A_D RPC 4 RPCM S01A_D RPC 5
P665	None
P670	MBSU 2 RBI 3
P671	MBSU 2 RBI 10
P672	MBSU 3 RBI 3
P673	MBSU 3 RBI 2
P674	RPCM S01A_D RPC 2 RPCM S02B_D RPC 4 RPCM S02B_D RPC 5

### Foot Restraints:

Task	WIF	APFR Setting
Fluid Tray Installation (Bolt 10)	Lab 12	11, QQ, L, 12

### Note:

1. Verify safety tether stbd of BOB during deploy
2. Wait to insert fluid tray PIP pin until after EV2 has performed a fluid QD reach assessment at the BOB

### Cautions:

1. No red band may be visible on waist tether prior to local tethering to gap spanner.

### Warnings:

1. None

## RELOCATE & DEPLOY NODE 2 LOOP A FLUID TRAY – TASK DATA

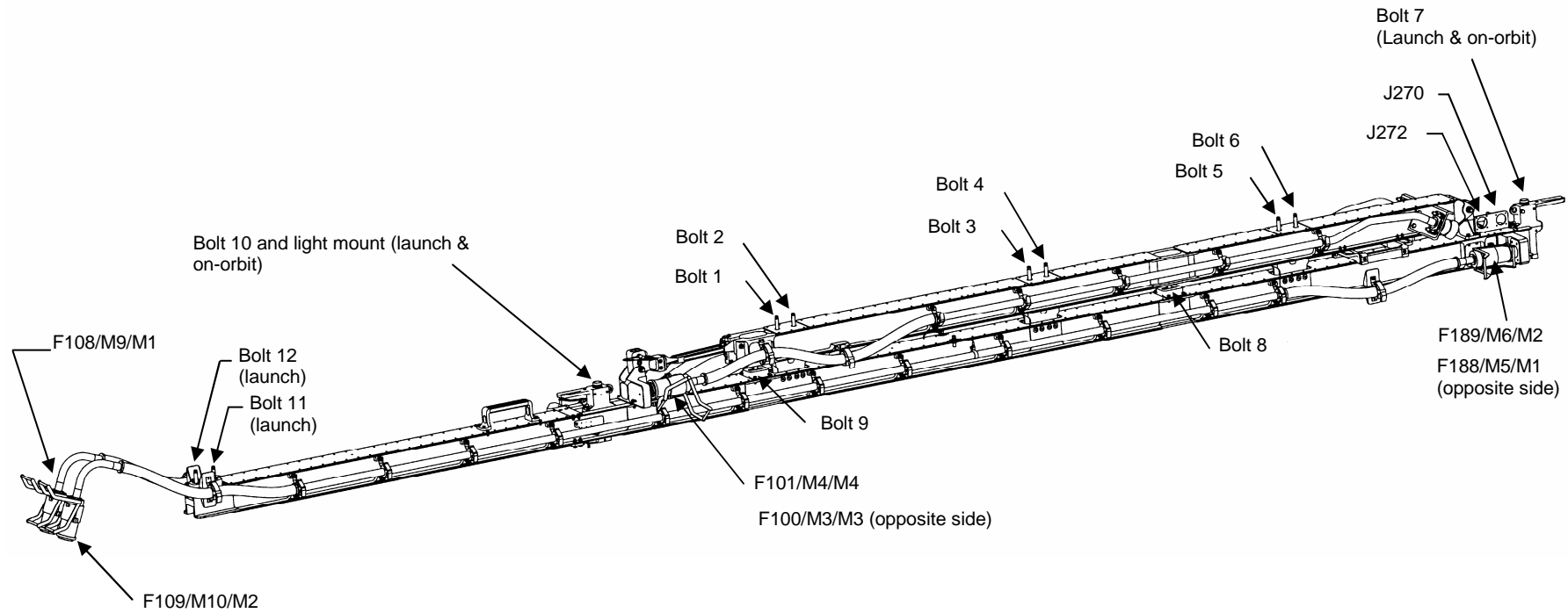


Figure 7. Node 2 Loop A Fluid Tray (stowed config)

## RELOCATE & DEPLOY NODE 2 LOOP A FLUID TRAY – TASK DATA

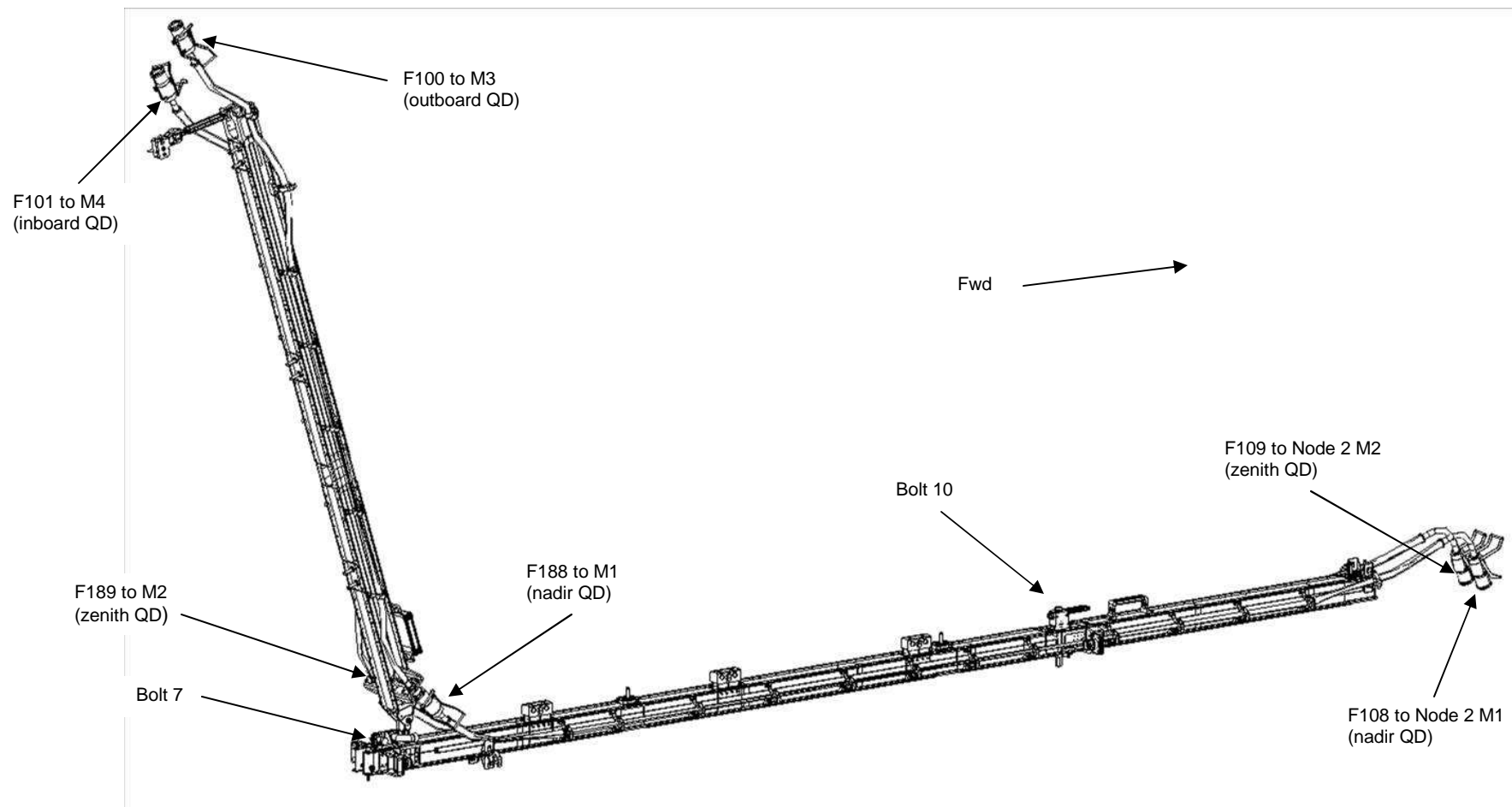


Figure 8. Node 2 Loop A Fluid Tray (deployed config)

## RELOCATE & DEPLOY NODE 2 LOOP A FLUID TRAY – TASK DATA

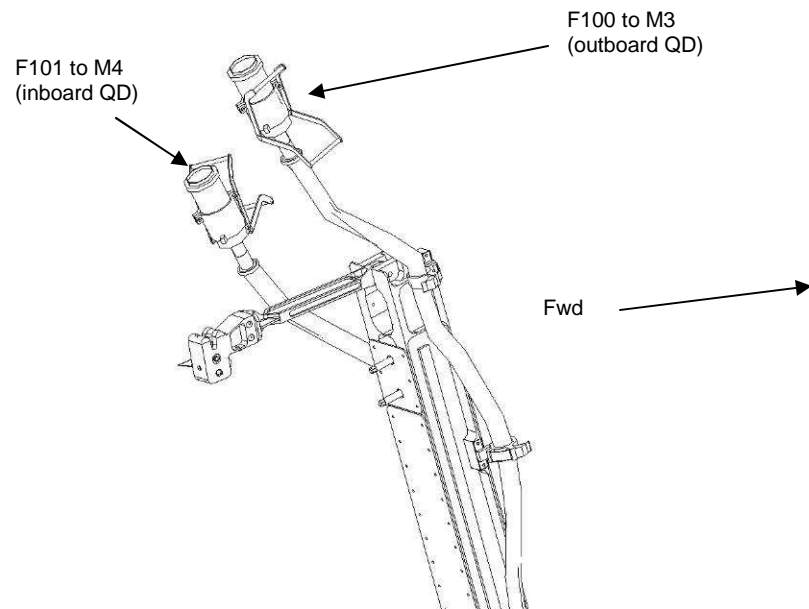


Figure 9. Node 2 Loop A Fluid Tray - S0 QDs

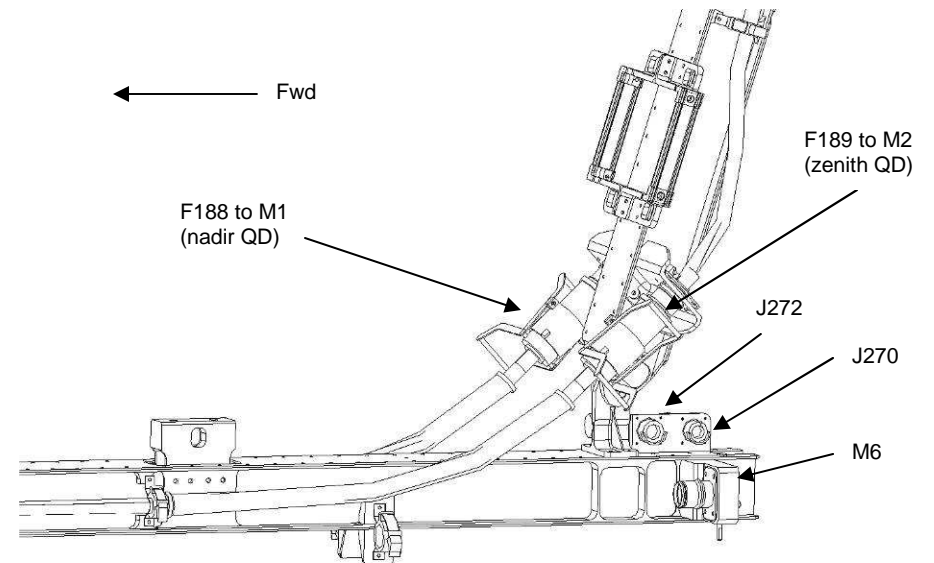


Figure 10. Node 2 Loop A Fluid Tray - Hinge QDs (deployed config)

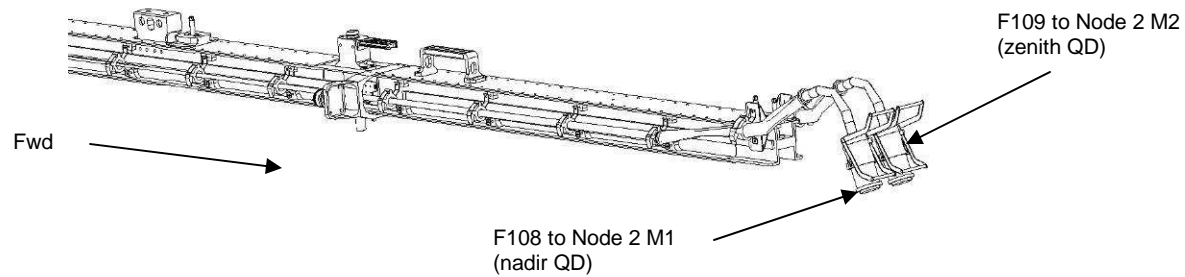


Figure 11. Node 2 Loop A Fluid Tray - Node 2 QDs

## RELOCATE & DEPLOY NODE 2 LOOP A FLUID TRAY – TASK DATA

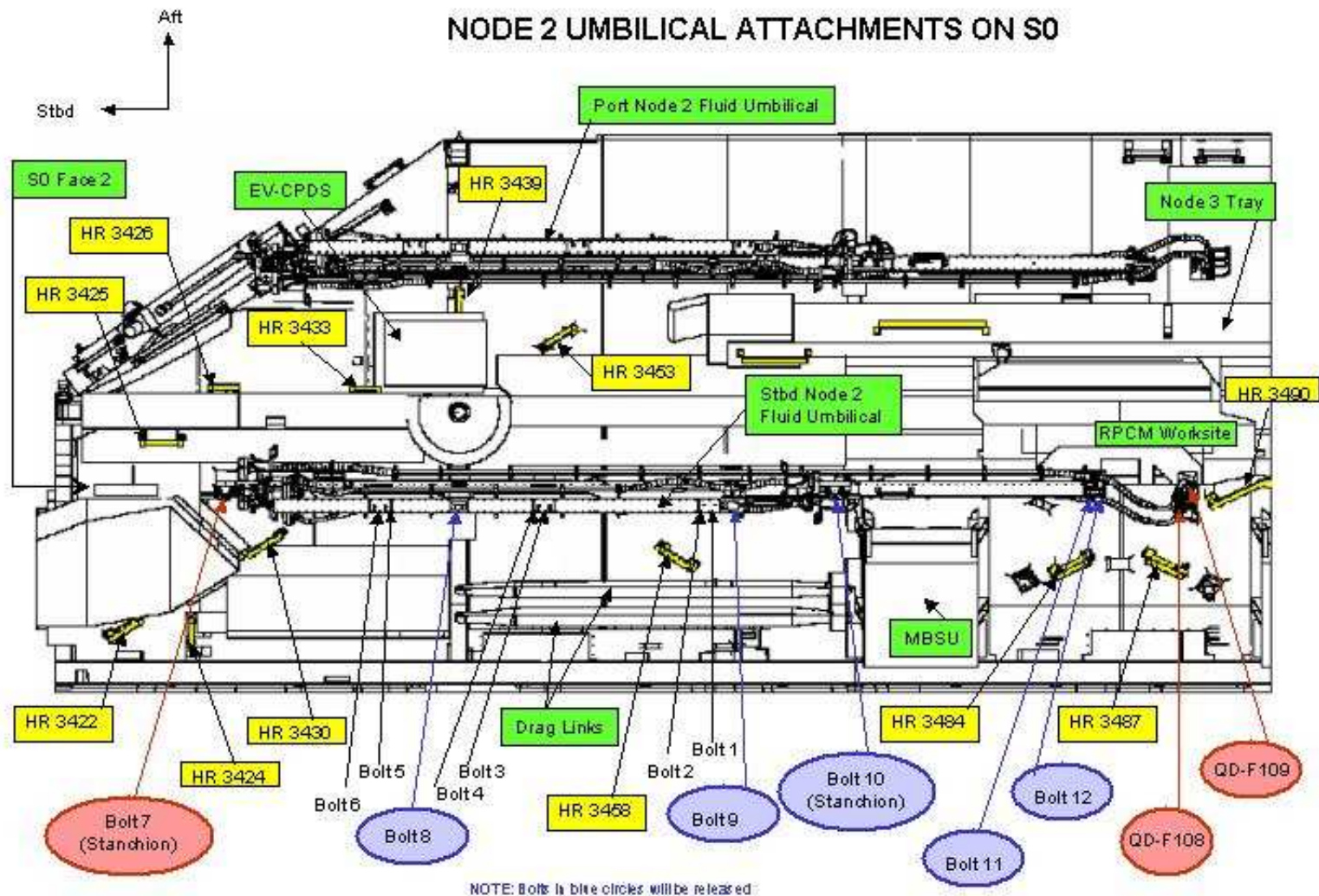


Figure 12. Node 2 Fluid Tray Attachments on S0

## RELOCATE & DEPLOY NODE 2 LOOP A FLUID TRAY – TASK DATA

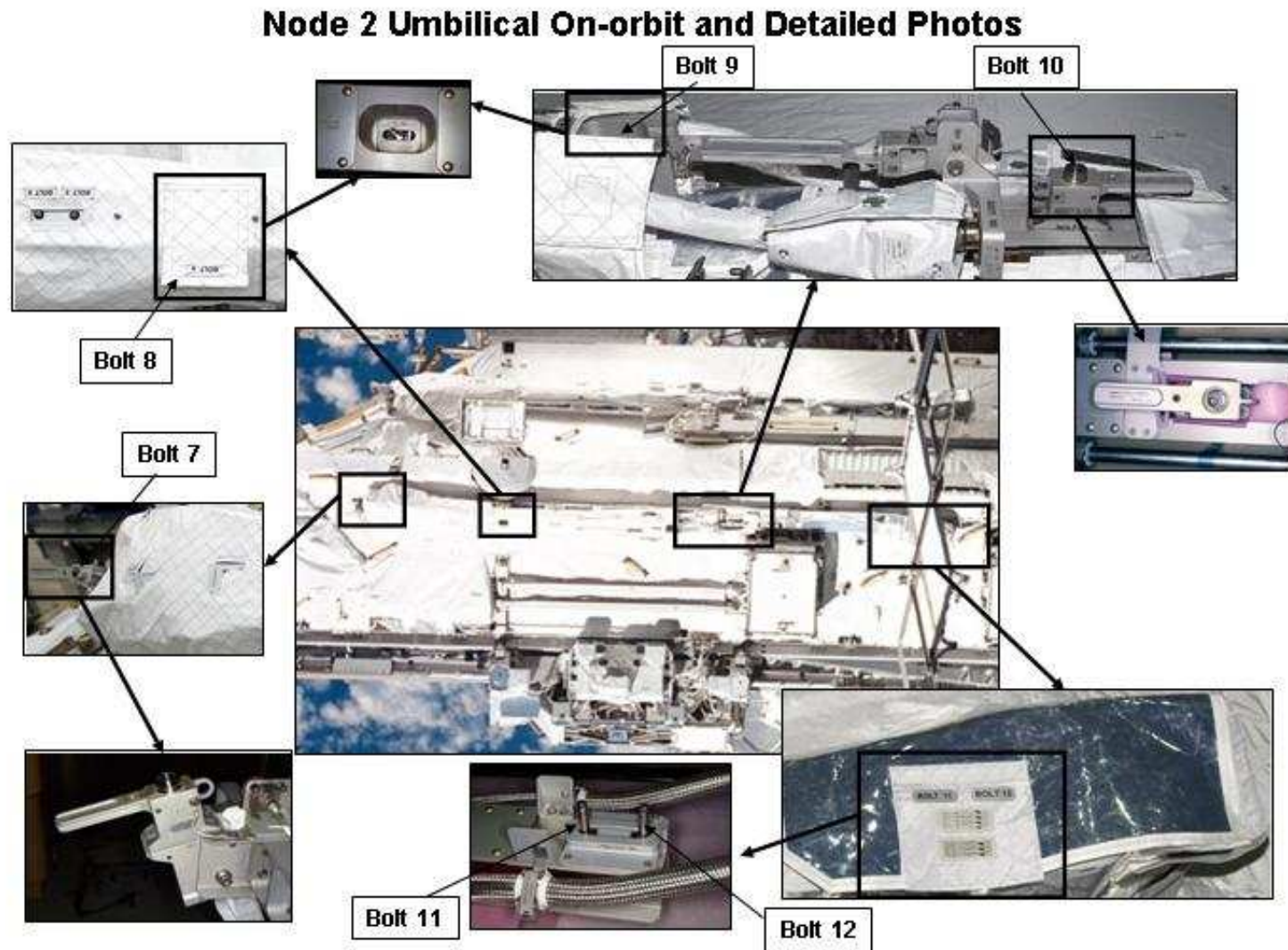


Figure 13. Node 2 Fluid Trays On-Orbit Photos

## RELOCATE & DEPLOY NODE 2 LOOP A FLUID TRAY – TASK DATA

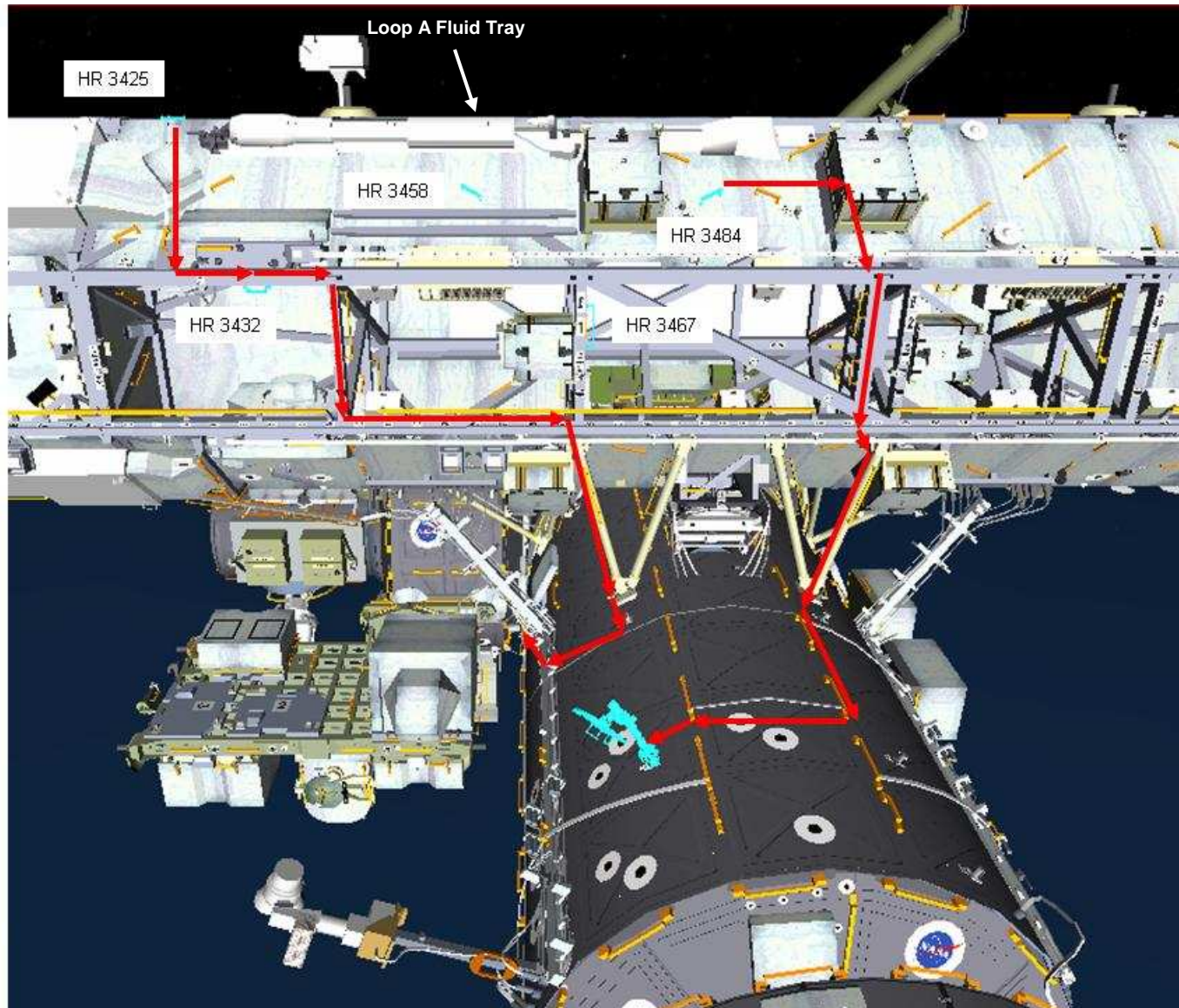


Figure 14. Loop A Fluid Tray relocation translation paths

## RELOCATE & DEPLOY NODE 2 LOOP A FLUID TRAY – TASK DATA

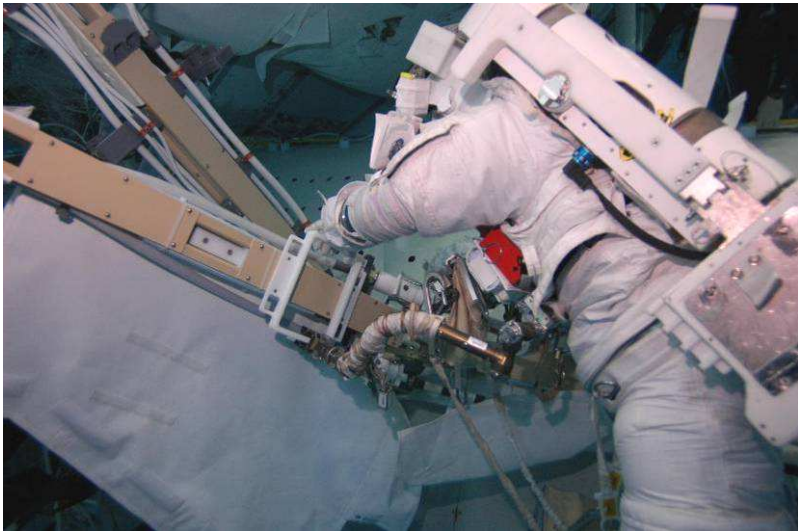


Figure 15. Fluid tray handhold BRT position for mating hinge QDs

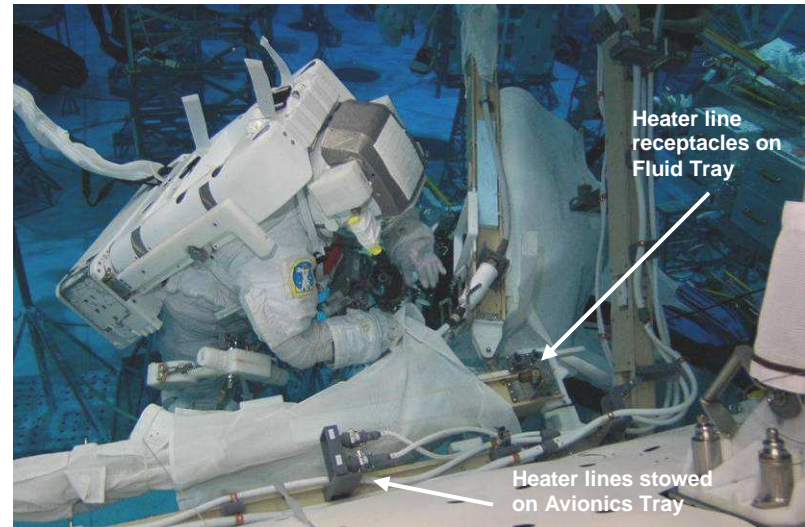


Figure 16. Heater lines mated to avionics tray

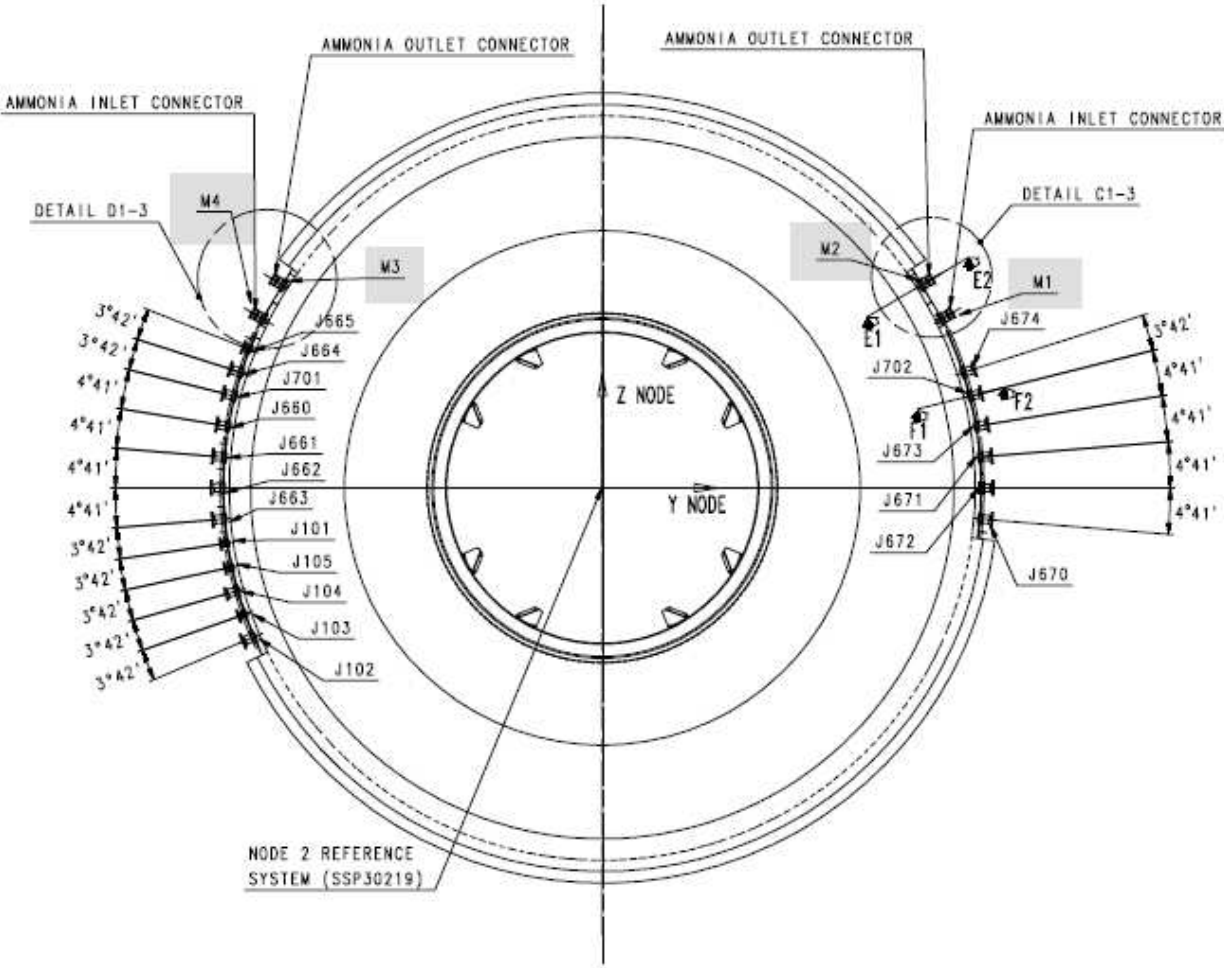
LAB TO NODE 2 UMBILICALS – TASK DATA



J665 - J661



J663 - J102



VIEW LOOKING FORWARD



M2 - J673



J674 - J670

Figure 17. Node 2 Aft Connectors (Avionics and Fluid)

## LAB TO NODE 2 UMBILICALS – TASK DATA

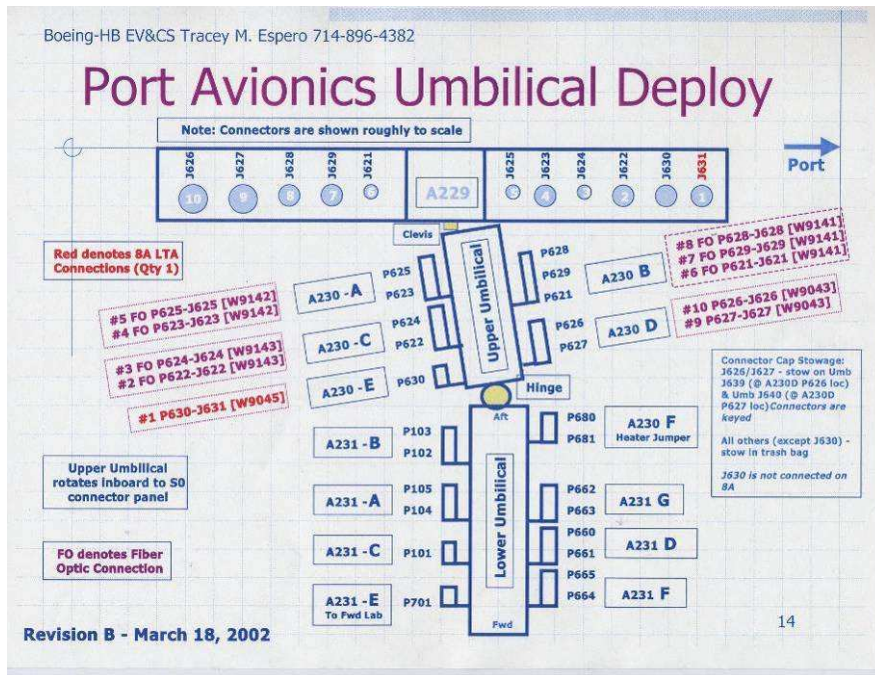


Figure 18. Port Avionics Tray Connector Diagram

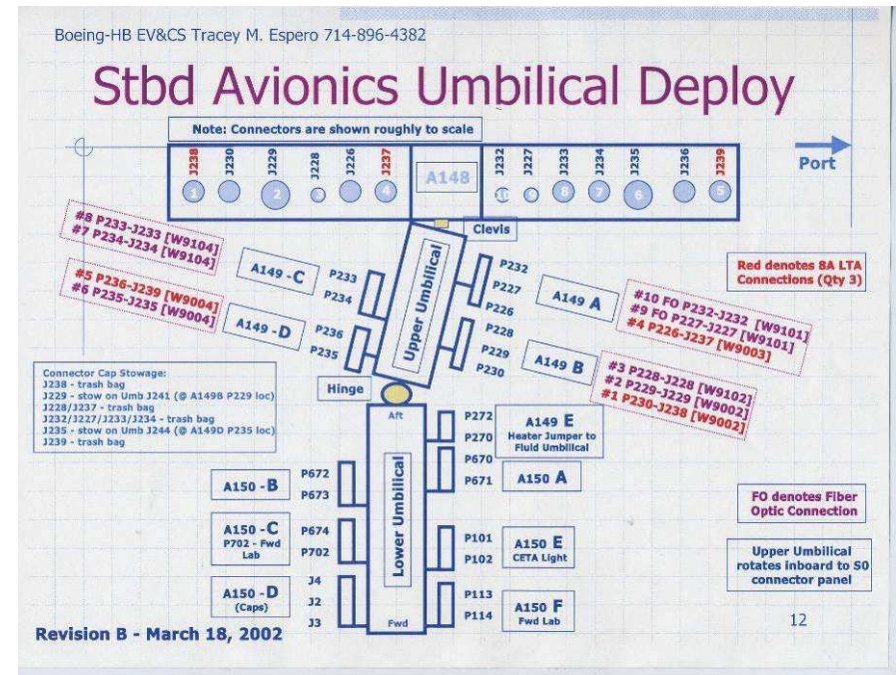


Figure 19. Stbd Avionics Tray Connector Diagram

## PMA2 TO NODE 2 UMBILICALS – TASK DATA

Estimated Task Duration:

	With RMS	Without RMS
One EV Crew	N/A	0:35 (Primary) 0:35 (Redundant)
Two EV Crew	N/A	N/A

Tools:

EV1 (FF)	EV2 (FF)
BRT	BRT
Wire Ties	Wire Ties

EVA Connectors:

Harness	From	To	Conn Size	Function
P609 (R)	PMA 2	Node 2	25	None
P610 (P)	PMA 2	Node 2	25	None
P611 (P)	PMA 2	Node 2	17	Data – RTDs, GNC Moding
P612 (P)	PMA 2	Node 2	21	Shell Heaters
P613 (P)	PMA 2	Node 2	15	Data – 1553 A, Video
P614 (R)	PMA 2	Node 2	15	Data – 1553 B, Video
P615 (R)	PMA 2	Node 2	15	None
P616 (R)	PMA 2	Node 2	15	Data – Audio

Connector Inhibits:

Task	Inhibit
P609 (R)	None
P610 (P)	None
P611 (P)	None
P612 (P)	DDCU LA1A OR LA4A CONVERTER - OFF RPCM N21A4A_B RPC 1-5, 12-16 - OPEN, CL CMD INH
P613 (P)	None
P614 (R)	None
P615 (R)	None
P616 (R)	None

### Notes:

1. Verify pin and EMI band integrity; verify connector free of FOD
2. No inhibits required for PMA2 redundant umbilical mates

### Cautions:

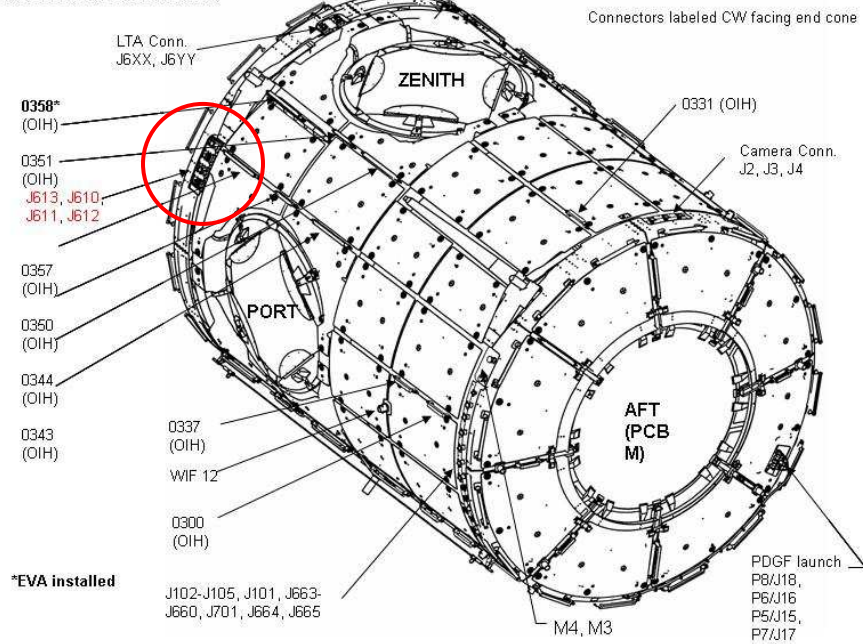
1. Avoid bend radii < 10 times cable diameter
2. Avoid pulling on cable during mate/demate
3. Bail linkage on P613 is broken and will require modified technique

### Warnings:

1. None

## PMA2 TO NODE 2 UMBILICALS – TASK DATA

### ZENITH PORT HANDRAILS



### STBD ZENITH HANDRAILS

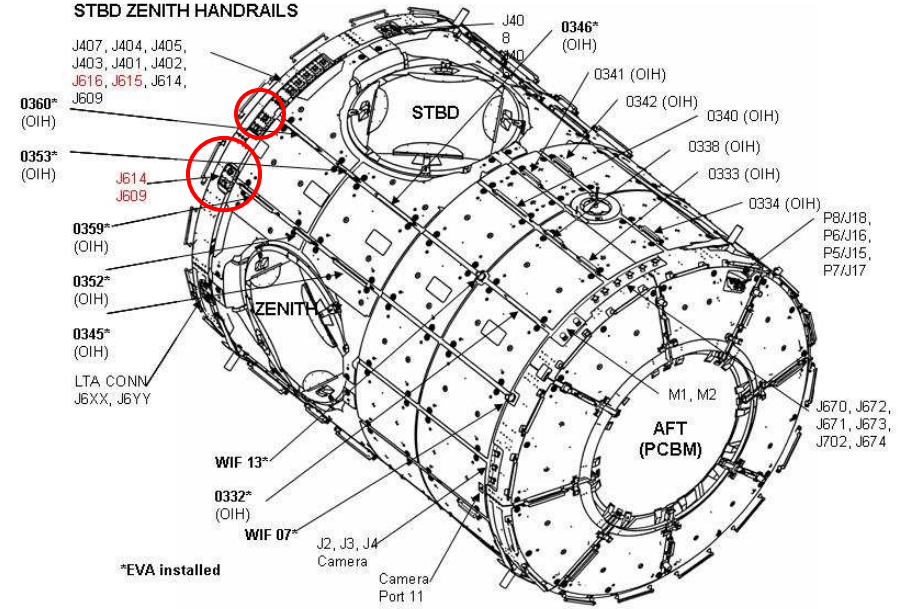


Figure 20. Port/Zenith Node 2 Connector Panel (left) and Stbd/Zenith Node 2 Connector Panel (right)

## PMA2 TO NODE 2 UMBILICALS – TASK DATA

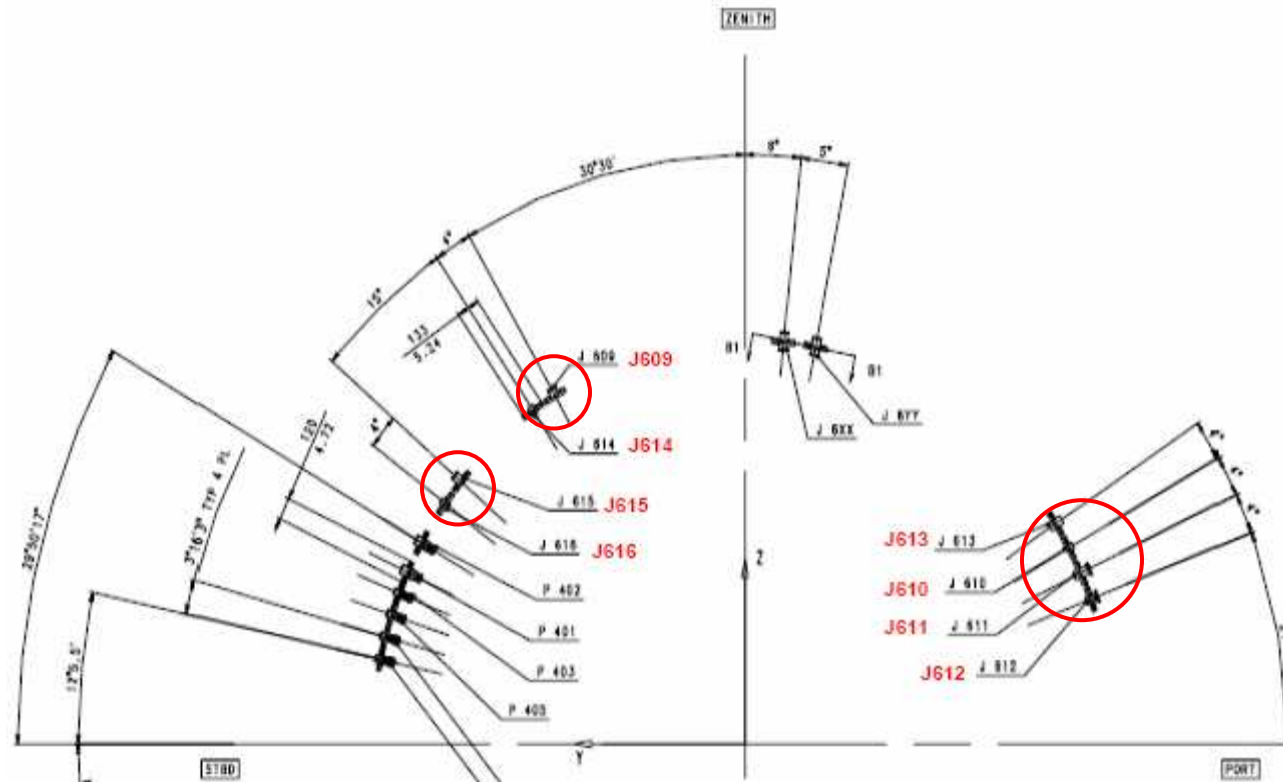


Figure 21. Node 2 connectors

## RELOCATE APFR – TASK DATA

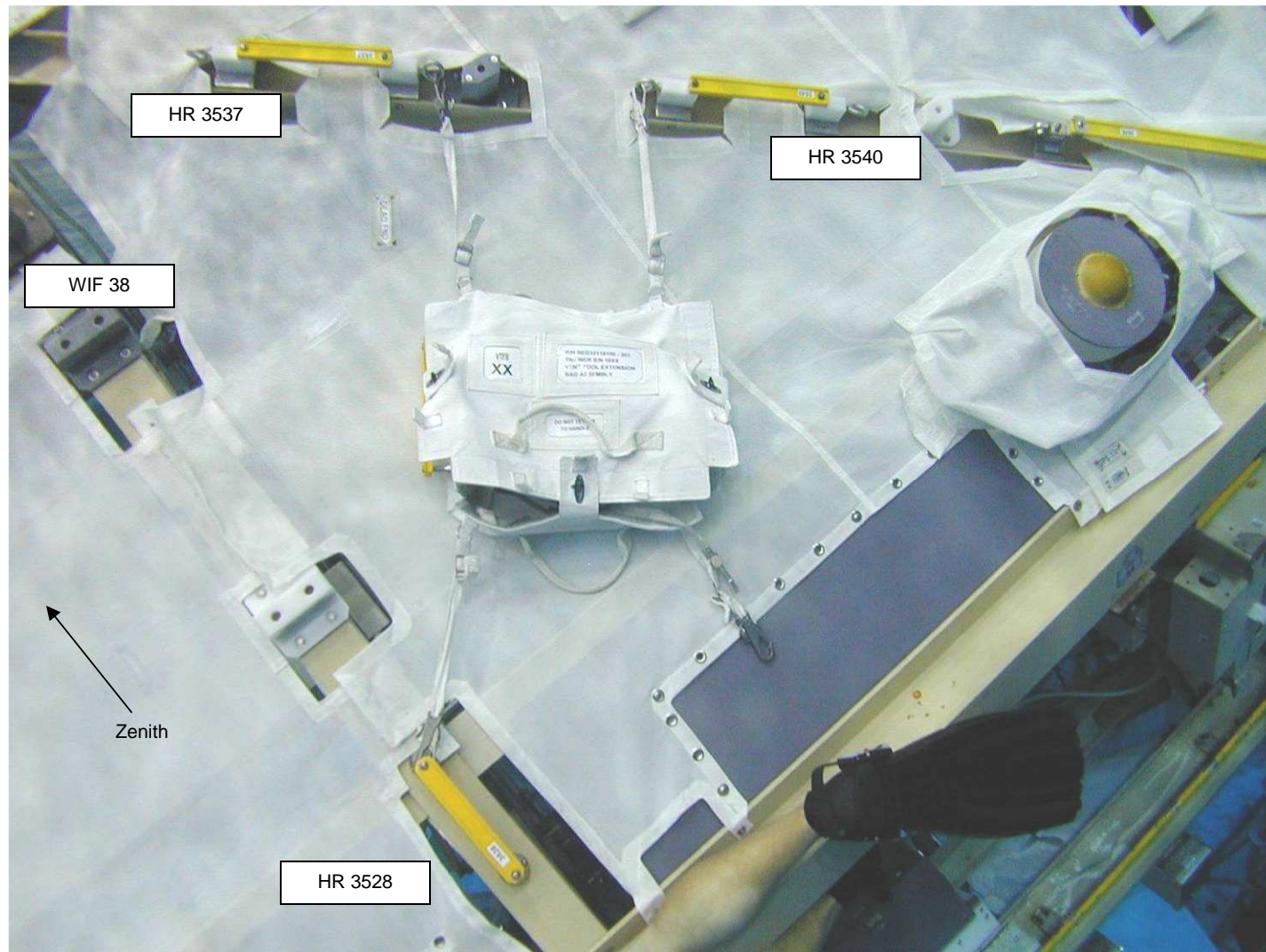


Figure 22. Vent Tool Extension (VTE) Bag location after relocate for port shunt jumper

## POST US EVA 10 TOOL CONFIG – *Not Complete*

### EV1

- ☐ MWS
- ☐ BRT (L)
- ☐ RET (eq-eq)
- ☐ Wire Ties
- ☐ Short (1)
- ☐ Long (1)
- ☐ T-Bar
- ☐ RET (eq-eq) (3)
- ☐ RET (eq-eq) w/ PIP pin (1)
- ☐ Adj Tether (1)
- ☐ Wire Ties (2)
- ☐ Small Trash Bag
- ☐ Socket Caddy
- ☐ 7/16 Socket - 9 ext (w/ decoration)
- ☐ 7/16 Socket - 2-in ext
- ☐ Wire Tie Caddy (1)
- ☐ Swing Arm (R)
- ☐ PGT [MTL 30.5] S/N \_\_\_\_\_
- ☐ PGT Battery S/N \_\_\_\_\_
- ☐ RET (eq-eq)
- ☐ Waist Tether (R & L)
- ☐ D-ring Extender (R & L)
- ☐ SAFER
- ☐ WVS
- ☐ Safety Tether 85'

- ☐ Crewlock bag #4 (QD Tools)
- ☐ w/ RET (Lg-sm)
- ☐ Adj Equip Tether (bag exterior)
- ☐ 1" QD Release Tool (on internal RET)
- ☐ 1" QD Bail Drive Lever (on internal RET)
- ☐ RET (1 to internal tether point)
- ☐ N2 Vent Tool
- ☐ RET (2 for SPDs - to internal tether points)
- ☐ RET (1 for vent tool - to ext bag handle)
- ☐ RET (1 to internal tether point)
- ☐ Button depress tool (1-in)
- ☐ RET (1 to internal tether point)
- ☐ Anti Kickback Tool (1-in)

### EV2

- ☐ MWS
- ☐ BRT (L)
- ☐ RETs (eq-eq)
- ☐ Wire Ties
- ☐ Short (3)
- ☐ Long (2)
- ☐ T-Bar
- ☐ RET (eq-eq) w/ PIP pin (2)
- ☐ RET (eq-eq) w/ PIP pin (1)
- ☐ Wire Ties (2)
- ☐ Small Trash Bag
- ☐ QD pressure caps (2, M1 and M2)
- ☐ Wire-tie (1) (fairlead)
- ☐ Wire-ties (2) (fluid QDs)
- ☐ Socket Caddy
- ☐ 7/16 Socket - 9 ext (w/ decoration)
- ☐ Swing Arm (R)
- ☐ PGT [MTL 30.5] S/N \_\_\_\_\_
- ☐ PGT Battery S/N \_\_\_\_\_
- ☐ RET (eq-eq)
- ☐ Waist Tether (R & L)
- ☐ D-ring Extender (R & L)
- ☐ SAFER
- ☐ WVS
- ☐ Safety Tether 85'

- ☐ Crewlock Bag #1
- ☐ w/ RET (Lg-sm)
- ☐ Adj Equip Tether (bag exterior to secure bag at worksite)
- ☐ Adj Equip Tether (on internal RET, was for SPDs)
- ☐ Adj Equip Tether (on internal RET, was for SPDs)
- ☐ Digital camera w/ RET
- ☐ RET
- ☐ to Adj Equip Tether
- ☐ Caps (2)
- ☐ Node 2 MLI (ammonia)
- ☐ Node 2 MLI (avionics)
- ☐ Adj Equip (2 - for handling on ext bag handle)
- ☐ Wire-tie (used to secure fluid QDs during relocate)
- ☐ Jettison Stowage Bag
- ☐ RET (on drawstring, bundled in bag)
- ☐ Adj Equip Tether - for handling (to RET, bundled in bag)
- ☐ Adj Equip Tether (for handling) (to adj, around bundle)

### AIRLOCK CONFIG

- ☐ Staging Bag
- ☐ Fuse Tether (1)
- ☐ Connector Cleaner Tool Kit
- ☐ Connector Pin Straightener
- ☐ Probe
- ☐ Velcro/Tape Caddy
- ☐ Pry Bar
- ☐ Fuse Tether (1)
- ☐ PGT (spare) S/N \_\_\_\_\_
- ☐ PGT Battery S/N \_\_\_\_\_
- ☐ Wire Tie Caddy (w/ 9 wire ties)
- ☐ Vise Grips
- ☐ EVA Ratchet
- ☐ Cheater Bar

### IV Bag

- ☐ Contamination Detection Kit
- ☐ Gold Salt Coupon (6)
- ☐ Color Chart (2)
- ☐ ISS Contamination Sampler (2)
- ☐ Shuttle Contamination Sampler (2)
- ☐ Nitrogen Dioxide Draeger Tube (6)
- ☐ Ammonia Draeger Tube (6)
- ☐ DCM Plug (2) - SAFER Hard Mount
- ☐ GP Caddy (2)
- ☐ Thermal Mittens (2 pr)
- ☐ Socket Caddy
- ☐ 1/2 x 8-in socket (IV Hatch)
- ☐ 7/16 x 6-in socket (backup)
- ☐ Fuse Tether
- ☐ Long duration tie-down tethers (4)
- ☐ 1 – RET (Lg-sm) (was for APFR)
- ☐ D-ring extender on EVA hatch D-ring